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VOLUME 3, NUMBER 4, AUGUST/SEPTEMBER 1986

For CP/M Users!

Morrow Owners' Review

THE INTERNATIONAL MAGAZINE FOR USERS OF MORROW & CP/M COMPUTERS

MAINTENANCE & REPAIR

Daisy-Wheel Printer Care

Should You Clean Your Disk Drives?

Auction at Morrow

Where to Go for Repairs

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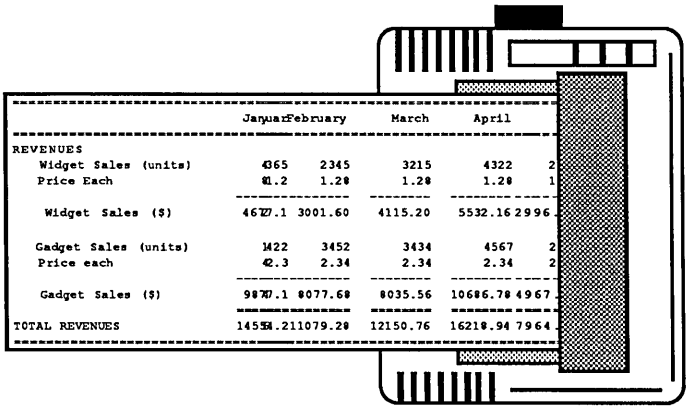

	Januar	February	March	April	
REVENUES					
Widget Sales (units)	4365	2345	3215	4322	2
Price Each	$1.2	1.2$	1.2$	1.2$	1
Widget Sales ($)	4677.1	3001.60	4115.20	5532.16	2996
Gadget Sales (units)	1422	3452	3434	4567	2
Price each	42.3	2.34	2.34	2.34	2
Gadget Sales ($)	9870.1	077.6	$035.56	10686.7$	4967
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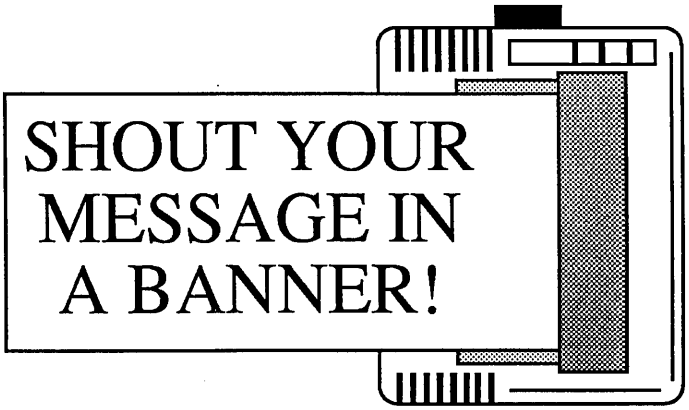

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EDITORIAL

To Fix It Yourself or Not, That Is the Question.

If you own a Morrow computer, you need this issue. It's a basic primer with most of the knowledge you need to keep your machine healthy or to get it better after it gets sick. This doesn't mean that you have to turn into a technician. Many of the repairs explained in this issue are simple ones. If you can read the instructions, you can make the repair. And chances are, you may never have to use the information given here. Your machine may run smoothly for many years. We offer this primarily as backup, as insurance that should some small thing go wrong, you won't be stuck on the error message for days on end or out of big bucks because you brought it to a shop for something you could have fixed yourself in 15 minutes.

The word from the repair shop owners is that more and more of you Morrow owners are fixing it yourselves. At least, that's the conclusion the shop owners draw from the increasing number of calls they receive soliciting advice of a technical nature. This issue could save you that phone call. So keep it and other MOR back-issues on hand. This won't be the only issue with tips and hints on how to keep your machine going. We'll continue to gather basic fix-it information and to pass it on to you in simple, readable form.

Spare Parts Supply Has Grown.

For a while it was not so clear where the Morrow-specific spare parts were going to come from. Silicon Valley Surplus (or SVS, see interview with owner in this issue) slowly ran out of such hard-to-get items as PC (mother) boards and MT70 terminals. The public auction at Morrow (see article on page 24) came just in time to replenish SVS, now our major source of spare parts for years to come.

With Morrow's doors closed and its dealer network dissolved we--as a users' community--must be a little more resourceful than in the past. But we have two favorable circumstances on our side: The refreshed supply of spare parts and the continued availability of places where we can have our machines repaired. We have complied a list of these resources in this issue. It's rather incomplete, but at least it's a start. Let us know of any places we left out.

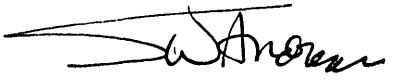
A MOR BBS in the Offing?

Magazines have their limits in terms of getting technical information to you at the time you need it. If you have a nagging problem with your computer system, writing a letter to the Mailbox column is not going to get you a solution fast. The time between issues is just too long. Phone calls for help to the MOR office sometimes work but often don't. We're not set up as a service bureau, and getting a satisfactory answer depends too much on the skills of whom you happen to get on the phone. So we are considering another channel of communication to speed along questions and answers between users: A MOR BBS or electronic bulletin board. We'd like to know what you think of this idea.

It would be nothing unusual, really. Just a BBS like the one BAMDUA maintains for its members and friends, and very much like the thousands of BBSs already operating around the United States. Then why another one? For one thing, the BAMDUA BBS has become so busy, it's harder and harder to get on line. For another: A MOR BBS could be more than a message system. It could include several additional features designed to quickly deliver the specialized help and information you need.

What might those features be? Here are a few for starters: An instantly updated list of known repair shops; a depository of all the Public Domain software that has ever appeared on FLOBs and more; a directory of reviews of Morrow-usable software and hardware, not necessarily limited to those printed in MOR; and a data base that you remotely operate containing phone numbers and/or addresses of knowledgable MOR subscribers willing to help. In addition, this MOR BBS could serve as the major channel for transferring articles to MOR. Many more possibilities exist, including some you may wish to add.

A MOR BBS, like any bulletin board system, has one major drawback. If you live far from Berkeley, you'll have to shell out long distance money. If you are in deep trouble and you need help fast, you may not mind those costs. But you may find them prohibitive if you're making regular calls to browse, keep contact, and see what's new. To solve this problem, we are looking into a way to join an already existing communication network that would allow most MOR subscribers around the country to contact the MOR BBS with a local phone number. What's your vote? If we installed a MOR BBS, would you use it? Let us know.



LETTERS TO THE EDITOR

LIVING WITH MORROW'S DEMISE

Dear Editor:

Naturally, as soon as my MD3 heard about the Morrow bankruptcy, it started acting funny. Probably sympathy pains. Anyway, it started putting stray characters on the screen after certain key sequences. I called about 15 places, but no one would work on it. The only nibble I got, if you can call it that, is that one dealer offered to sell me a new keyboard for $206; I guess I should have been indebted to him for at least that.

Don DeMaio, Barrington, RI

[Do you have an MT70 or MDT60 terminal? Call Silicon Vallay Surplus in Oakland 415/261-4662. They sell complete insides of these keyboards for $25. --Ed.]

AUSTRALIAN SUPPORT

Dear Editor:

The passing of Morrow Designs is a sad commentary on the "new is better" syndrome of computing, but it would seem from the pages of MOR that Morrow users in Australia are in far better shape than in the U.S. The main importer, Automation Statham, has always provided good service at both reasonable cost and in reasonable time. They were very swift to issue public statements assuring the locals of continued support for their Morrow equipment. With them and MOR we are clearly better of than our colleagues with Osbornes, etc.

R.J.H. Deane, Chapman ACT 2611, Australia

LONG LIVE CP/M

Dear Editor:

I think we CP/M devotees---or reactionaries, if you prefer---can take heart from Pournelle's remarks in the June issue of Byte Magazine. It appears that the industry perceives a need/demand for CP/M. I note a surge of ads for the V series of processors, which will run both PC-DOS and CP/M as replacements for the 8088 and 8086. Programs that need no more than 64K of RAM seem to run much better under CP/M 2.2 than under MS-DOS or PC-DOS or even CP/M86. Perhaps the honeymoon with IBM and MS-DOS may be fading a bit, and I suspect that computers with the V series of CPUs will be the survivors after Apple, Commodore and Atari go into Chapter 11.

Jesse Adams, Olga, WA

CLOCK OF THE BRAVE

Dear Editor:

I have never seen an advertisement for anyone selling a real time clock for Morrow computers. I bought a "Kaypro" real time clock from Advent Products and, after getting my Z80 socketed, mounted the clock in a 1985 MD3 with the Japanese motherboard and it worked perfectly. Also, the software that Advent provided for operating the clock on the Kaypro worked on the MD3. I called Advent back and reported this. Their response was: "You are brave! We thought that it might work but haven't had time to test it."

Coleman Smith, Fayetteville, NC

[Actually there have been several ads for clocks in MOR, but not all of them have worked satisfactorily. The MORE Clock for the MD hard-disk machines often failed. See also MOR Vol. 2, #3, p. 45, on the Z-Clock. --Ed.]

WIDENING THE AUDIENCE FOR MOR

Dear Editor:

I would support your efforts to widen the audience base to cover other CP/M users but do not forget that we, the Morrow users, are MOR's electorate, the rationale for your existence. Any widening of the base should not be bought at the expense of the Morrow owner or you will go the way of that other excellent journal, Micro Systems.

Robert Deane, Chapman ACT 2611, Australia

[As you can see, this issue and the previous one are rather Morrow-specific, but many issues are filled with articles that could equally well apply to other CP/M users, and we do need more subscribers in order to survive. **One way all subscribers could help---this suggestion comes from a MOR reader ---is to present their local public libraries with a MOR gift subscription under the "ADOPT-A-MAGAZINE" plan.** --Ed.]

UPDATES

Two significant problems have surfaced with last issue's article on converting your MD2 to an MD3 (MOR Vol. 3, #3, p. 5). If you have an MD2 with a Rev. 1.3 BIOS, you will need to update two programs and make slightly different modifications. Contact the MOR office for more details. If you find that you can read your disks with your new drives, but you cannot write to your disks, the terminator packs on your new drives are the culprits. For more information, contact the MOR office.

B.H. Marshall, author of "Your 4-Drive Morrow: Adding 2 More Drives to Your MD3" (MOR, Vol. 3, #3, p. 11), reports that since writing the article, his disk drives now occasionally spontaneously start (i.e., either the stepping motor switches on or the drive motor runs continuously). Although this doesn't affect the performance of the drives, it does put unnecessary wear on them.

To correct this, he recommends increasing the voltage on the -5V line and the +12V line that leads to the drives by 5 percent.

Advanced Concepts "Mini Winnie"

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Big Board I,II	✓	✓	✓		
Xerox 820-I,II	✓	✓	✓		
Micro Mint SB-180	✓	✓	✓		
Gemini Zorba	✓	✓	✓		
Osborne	✓	✓	✓		
Sanyo MBC-1150/ 1160/1200	✓	✓	✓		
AVL Eagle (with mods)	✓	✓	✓	(You may delete $90 for external systems less P/S enclosure Add $6 00 for extra long cables)	
Alspa II	✓	✓	✓		
Epson QX-10	✓	✓	✓		
Morrow MD-2,3	✓	✓	✓		
Z-80 S-100 Computers	✓	✓	✓		

The key to the Mini-Winnie system is the INSTALL program, which links your drive and your computer, the way YOU want it. Extensive menu options allow selection of any ST-506 compatible drive, as 1 to 4 logical drives within CP/M at any drive letter. Diagnostic and formal capability provided to match the installation. Distributed in SOURCE form. Compatible with most other add-ons, including SWP CoPower, ZCPR3 and microsphere.

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IMPORTANT ANNOUNCEMENTS

More ROM update kits.

MOR now has update kits for the MD hard disk machines (MD5, MD11, MD16 and MD34) available. This is what you get: An MD-HD ROM Rev. 1.9 and three floppies with a set of the latest Morrow-written CP/M utilities and systems software, plus some goodies. These floppies are not replacing the three CP/M distribution disks; for one thing, the floppies don't have CP/M system tracks so you can't boot from them. But you can update many COM and SYS files by copying over your old ones with PIP or NSWP. Also included are how-to instructions and a printed directory of 10 floppies (not included) that are loaded with MD11 systems software source code files for those who want to dig deeper. An order form is added to order these floppies at $8.00/floppy or $65.00 for the whole bunch of 10. In addition, you can order a new manual called MD-HD Systems Notes filled with "bubble diagrams" of the firmware and copies of Software Change Notices; about 120 pages for $25.00. Esoteric stuff. Get some advice before you buy. The MD-HD update kit is $45.00 plus tax. Use the order form on page 45.

Quest Support.

The James River Group has bought the rights to Quest and will be offering both support and upgrades. You can reach them at 125 North First Street, Minneapolis, MN 55401, 612/339-2521.

MD2 and MD3 ROM Update Kit Update.

If you're considering buying a ROM update kit for your MD2 or MD3 (as mentioned in the last issue of MOR, p. 26), you should first check to see what motherboard revision your computer has; the ROM update will only work with Rev. 2 boards. If you're not sure what revision board you have, there's an easy way to find out: The ROM revision number usually appears on the screen when you first turn your computer on. ROM Rev. 1.X means you have a Rev. 1 board and cannot use the ROM update kit; ROM Rev. 2.X or 3.X means you have a Rev. 2 board and can use the kit. If your screen doesn't display this, there's another way to check: If you have a drive expansion port, you have a Rev. 1 board; if you have a Centronics parallel port, you have a Rev. 2 board.

Maintenance for Your Daisy-Wheel Printer

by I.I. Butler

Recently, I had to have my daisy-wheel electronic typewriter repaired, which would not have been necessary had the manufacturer given complete instructions for its care in the manual. What happened was that the lubricant dried up on the long rod or tube on which the carriage that holds the daisy wheel and moving parts rides back and forth, the carriage stuck, and the cable that moves that carriage jumped off its pulleys.

From this, I discovered that all daisy-wheel printers and typewriters periodically need some slight lubrication, as well as some cleaning. The manufacturers won't tell you how to do it, probably because they're afraid that most people will use too much lubricant and/or the wrong kind of lubricant and permanently damage the mechanism. Some manufacturers even tell users not to lubricate at all, stating only that periodic expert (expensive) service is required.

But this is not true, and by following the instructions here you can keep your printer happy and save yourself the cost of periodic service--and perhaps even the price of a repair job.

Cleaning Your Printer

First, turn off your printer and unplug it. Then, open the cover and, if possible, carefully remove it to a convenient flat surface, being sure not to scratch it. Then, following the manual instructions, remove the ribbon.

To clean the printer, you should use a slight amount of 91-percent (or higher purity) isopropyl (rubbing) alcohol, just barely dampening a clean, soft, 100-percent cotton cloth such as terry (an old wash cloth) or flannel (old pajamas). Do not use cloths made from synthetics; they will scratch many plastics and soft materials, as will most cellulose sponges you buy at a supermarket.

Never pour the alcohol directly on the machine, and do not use alcohol if your manual or dealer has specifically told you not to. In any event, never use it on the plastic case without first testing it in an inconspicuous place. (If you use it on a keyboard to remove finger smudges, it may slowly, over time, or even very quickly, remove the characters on the keys.)

You can use denatured instead of rubbing alcohol, but it is not as good. It is stronger, containing less water in combination with the alcohol, and it lacks the slight amount of oil they put in rubbing alcohol to make it less irritating to skin. That oil is good, not bad, for the black rubber platen and any other synthetic rubber parts you clean on your machine; these parts need just a tiny amount of oil like this to keep them from drying out and cracking.

First, clean the platen by rubbing the damp cloth over it, turning the platen to get all sides of it.

Now, clean the dust out of the floor of the printer.

You may find dust, hair, etc., in among electronic components and tiny mechanical parts that you really don't want to rub with anything as crude, large and clumsy as your hands and/or a cleaning rag. The best thing to use is a camera lens brush of soft camel's hair, with a rubber squeeze-bulb to blow gentle puffs of air while you are brushing. These usually cost less than $2 and are available at any camera store. They are useful not only for cleaning the insides of printers, but also for cleaning any ventilation slots on your monitor and between the keys on your keyboard (but if you do this, be sure to turn off the power so that you don't inadvertently change your terminal characteristics). When using the brush and squeeze-bulb, try to brush the dust either out of the device completely or to a place where you can pick it up and remove it.

If you use ink-impregnated fabric ribbons, your daisy wheel might be showing ink and general grime build-up. If it is, it can also be cleaned. To clean it, first carefully and gently remove it, being sure to follow manual instructions exactly. Then, lay it type-side-up on a paper towel on a flat surface well away from the machine. Use a soft toothbrush or your cleaning rag, thoroughly soaked with alcohol. Brush very gently from the center of the wheel toward the rim, passing over the type face. Do not brush sideways or along the rim, as this invites breaking off individual characters. Old ink and grime will be deposited on the paper towel. When you're through,

---

I.I. Butler is an attorney in private practice in Berkeley, CA, representing clients in corporation, contract, real estate and litigation legal matters. He is also an MD3 user, BAMDUA program director, frequent writer and reviewer for MOR, and songwriter.

let the daisy wheel dry completely in the open air before putting it back in the machine. When replacing it, again be sure to follow the manual instructions exactly, and don't force anything.

Lubricating Your Printer

Now, just look around inside your printer a little, and compare what you see with what's in your instruction manual. Your daisy-wheel carriage will probably ride on a long shaft or tube almost directly under the daisy wheel itself, and more toward the front of the machine there will be a second tube or rod, which is a guide for the back of the carriage. (See Figure 1.) With the power off and the switch off, you should be able to move the carriage back and forth by hand without much resistance.

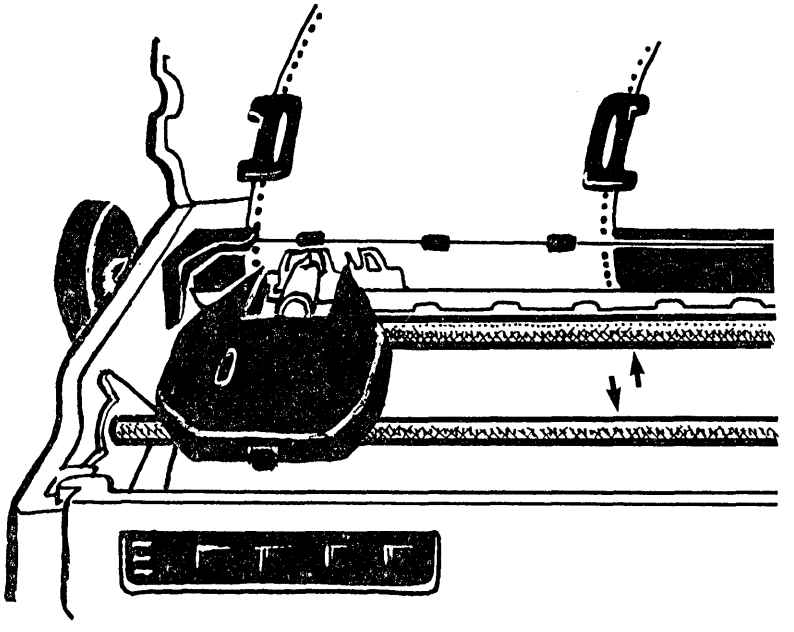

Figure 1. The daisy-wheel carriage rides on two rods, which should be occasionally be lubricated.

Next, with the clean tip of one finger only, feel each of the two rods or tubes. If they are clean and slippery, no lubrication is required. But if they are dirty or dry, or if the lubricant feels as if it is getting hard or thick, then you'll need to lubricate them. But before you reach for that can of 3-In-1 spray, there are some things you need to know:

First, many lubricants contain "petroleum distillates," and most of these will harm at least some kinds of plastics and synthetic rubbers. This is because plastics and rubbers are themselves petroleum derivatives, and petroleum distillates will either act as solvents to dissolve them or else combine with them to produce different substances. Products that will do this include 3-In-1 Oil; Singer and most other brands of sewing machine oil; Liquid Wrench; WD-40; LPS-1, -2 and -3; and many other commonly available products. Printer and typewriter manufacturers normally provide service personnel with either an oil that, although it contains petroleum distillates, does not harm that particular machine, or one that is silicone-based and contains no petroleum distillates.

Second, very few sprays of any kind belong near a printer or electronic typewriter, except in the hands of trained service personnel. Sprays, whether aerosol or pump, get all over everything, including many places they do not belong. Many will cause harm. The few that will not actually harm electronic components (e.g., 100-percent Freon TF sprays such as FD by Tech Spray) remove all lubrication, though, both oil and grease. I do not recommend these sprays for occasional maintenance because after using them you must perform a complete lubrication job, which is a more arduous project than most people want to undertake.

Third, the quantities of lubricant that are needed are measured in small drops, not in squirts or soaks. Most people over-lubricate everything.

What I now use on my Morrow/Silver Reed printer, Olivetti electronic typewriter, and even on the turning mechanical parts of a MITA photocopier, is a product called "Break-Free," which contains some petroleum distillates plus Teflon, but will not harm most plastics.

It is available at sporting goods stores, such as Big 5; many discount stores, such as Gemco (usually in the hardware and/or sporting goods department); some hardware stores; and virtually all gun stores. The smallest quantity, 2/3 of one fluid ounce, is all you need for the working life of several machines. It costs between 95 cents and $1.50. You must follow the instructions to shake it well (about 20 times) before use and, using the little tube that fits in the spout (which should be taped to the side of the bottle when you buy it), use it like an eyedropper. Do not buy or use the spray version for this kind of work.

If in doubt as to whether Break-Free might harm your printer, use a silicone-based oil that contains no petroleum distillates instead.

Before lubricating, wipe off any grime and old lubricant from the rods or tubes.

Now, to lubricate, you should put no more than four small drops of lubricant on each rod or tube that the daisy-wheel carriage moves back and forth on. The best way to do this is to move the carriage all the

way to one end, put three evenly spaced drops on the exposed rod or tube, spread them around a little with the clean tip of one finger, then move the carriage and put the fourth drop where the daisy-wheel carriage had been, also smearing this drop around a little with your finger. Finally, move the carriage back and forth the full length, to spread the lubricant around.

This is absolutely all the lubrication you must do, and you shouldn't have to do this even more than once in six months. Actually, once a year is sufficient, unless you have a very high volume of printing. (But the first time you use Break-Free, it will keep good on its advertised promise to float away old hidden dirt, so wipe the lubricated areas clean and dry and relubricate in about two weeks.)

You can also lubricate the bearings of the shaft on which the platen turns. The bearings are where this shiny metal shaft, which turns, passes through holes in metal that does not turn, at the ends of the platen. (See Figure 2.) Use only one small drop of oil, taking the utmost care not to let any fall through to any rubber or plastic parts, and only do this once a year.

Do not lubricate any non-metal nylon and plastic moving parts that contact only other non-metal parts. The nylon and plastic parts are self-lubricating. Do not try to lubricate the motor that drives the daisy wheel and/or carriage. These units almost always have sealed bearings. The only thing you can do with oil is mess up the electrical portion of the motor.

Be sure to keep all oil and grease away from all rubber parts, particularly the surface of the platen and the belt or gear drive that turns it. If you make a mistake and drop oil or grease on rubber, clean it up by wiping it with a cotton rag dampened with alcohol, then throw that rag away so you do not use it for cleaning later and inadvertently wipe the oil or grease back onto your machine.

Now, if you look around carefully, you will notice some metal shafts, rods or gears, which pass through, mesh with or otherwise contact nylon or plastic parts, and have some orange-colored grease on them. This is a silicone-based grease and in normal use will last the life of the machine. Usually, you can forget about lubricating these places. Above all, do not oil them, because the oil will wash away the grease and does not provide the same level of protection.

If you do a very high volume of printing, though, and notice that grease being worn away or gumming up with dust and lint, you can renew it yourself. Use a silicon-based grease called "plumber's grease," which is sold in hardware stores for squeaky faucets. Try to find a brand of grease that specifically says on the label that it does not contain petroleum distillates. Also, try to find a kind that is not especially hard and thick; some are extra thick because they work in a constant stream of hot water, and this is more viscosity than you need. After cleaning off the old, dirty grease, take a long slender tool, such as an awl or a knitting needle, and put very tiny dabs of this grease in the same places. If you have any doubts about your ability to do this right, leave the job to professionals. Fortunately, application of grease is not required more often than every two or three years.

Finally, you can polish some fine, not very deep scratches out of the clear, see-through portion of your printer cover. The products that do this are either polishes specifically designed for polishing scratches out of convertibles' plastic windows (found at many automotive stores) or fine metal polishes that state on the label or in written instructions that they can be used to polish scratches out of plastics

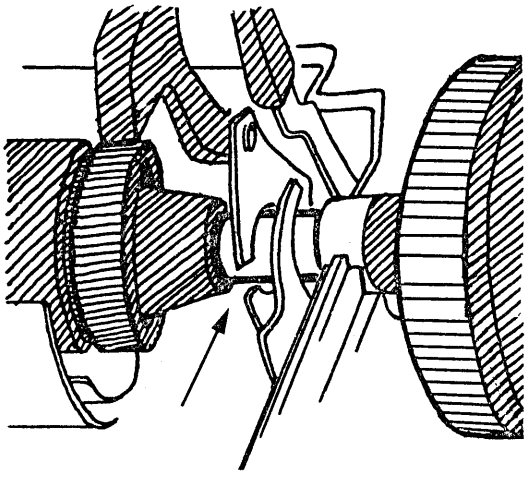

Figure 2. The bearings of the platen shaft, indicated here by an arrow, should be lubricated approximately once a year.

and plexiglass. If you decide to try this, be careful to lay the cover on top of a clean cotton terry towel on a perfectly flat surface so you do not put new scratches in or break it while polishing the old scratches out. If the scratches are deep or extensive, though, your only recourse is to order a new cover through a manufacturer's service outlet.

The instructions given here for cleaning and lubrication do not allow you to dispense with periodic expert service entirely; they only extend the time between services.

However, there are good reasons for obtaining complete service manuals for most of the electronic equipment in your office and performing your own service. One is not having to deal with the kinds of unemployed used-car salesman who inhabit much of the electronics repair world. ■

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The Man Who's Got the Parts:
An Interview with Brian Whittaker of Silicon Valley Surplus

by Sypko Andreae

MOR: Let's start at the beginning. How did you start Silicon Valley Surplus?

WHITTAKER: I used to work for Morrow. George gave me a job. He said, "I can't pay you much, but I'll give you some stock," and he was one helluva guy to work for. I'm sure that had he not been such a nice guy, he'd still have his company.

Q: What kind of job was this?

A: Janitor. Facilities manager was the official title. Security. Anything that had to do with taking care of the building. A technician I'm not. Before George, I worked for the phone company, stringing cables.

Q: Did George help you set up Silicon Valley Surplus?

A: Yeah, George, at Morrow, first started the idea of selling equipment out the back door. They had all this stuff they couldn't sell and they needed money. But the marketing department was going bananas about selling it out the back door, afraid that dealers were going to be mad. None of the professional people at Morrow wanted that. So it was very hard for me to get started. The C.E.O. at the time was Bob Dilworth, and he was sitting on the fence. Had it not been for George, it never would have gotten rolling. But I think that there comes a point where if you want to keep your product going, you need to provide some cheap support. That's kinda what we do now. While still working for Morrow, I saw all this stuff going out and then sold real cheap and said, "Jeez, there must be some money there." And that's how it got started. Started two days a week while I was still working at Morrow.

Q: When was that?

A: Two years ago. December of last year I left Morrow and started renting this building and going full time. Morrow had an auction in, I think, late January, and I went to that auction and bought a bunch of Morrow stuff.

Q: I understand that you originally had the "sole scrap agreement" with Morrow. What exactly was that?

A: That was an agreement whereby they sold me machines at their cost, and the agreement lasted from December to the end of February of this year. At that point, the bank got involved and said to them, "Naw, you're getting rid of the stuff too slowly." And so the bank was essentially responsible for the last auction. The bank was in it for about $5 million and they wanted that all back in four months. You can't sell that much--unless you do it at an auction, and at an auction it goes for far less.

(continued)

Q: How much did you buy at the last Morrow auction?

A: I spent almost $100,000, and I have all of the spare parts. And the software. I have a fair number of systems. I have them all. I bought all the spare boards, special hardware parts.

Q: So basically, you are the repository for all spare parts for MDs now?

A: If it goes in a Morrow MD, I've got it. I don't care what MD it was, I've got it. If it goes in a Morrow Micro Decision S-100, I've got it. If it goes in a Pivot I, I've got it.

Q: Can people order from you by mail or by phone?

A: Yes. We'll ship C.O.D. or we'll accept California checks, but we don't take credit cards or out-of-state checks.

Q: Can you tell us about the warranty you give, especially for people who live far away?

A: From the day they get it, from the U.P.S. delivery day, they have 15 days.

Q: Are there any parts you sell that aren't under warranty?

A: Oh yeah, I sell a lot of parts not under warranty. There are a lot of people who have a good working system, and they say, "Well, where am I going to get just one little thing." I sell them a bad board real cheap. And they use that for parts. There are people who like to fix them. I sell a lot of defective parts. But it's up front what you're buying, whether you're buying defective or not. If you're buying stuff that supposedly works, you've got 15 days to make sure it really works.

Q: At the auction, did you also buy MT70 and MDT60 terminals? They've been in short supply recently.

A: I think we bought 300-400 of the MT70s and many MDT60s. Most of them were without keyboards, but we had the keyboards from the previous auction.

Q: How about MDT50s?

A: We bought as many MDT50s as we could. We have a big pile of broken MDT50s. A lot of people like their '50s, and we carry the spare parts to fix them. Probably, the MDT50 terminals we have will be sold as spare parts. They're not as reliable as the MDT20 or the MDT60, so I don't recommend that a customer buy a used MDT50, because I don't think it's as good a terminal as the other two. I like the MDT60 best. It looks pretty, it has a good graphic set in it, and it works a long time. The MDT20 works a long time, too, but it's ugly. I guess that's a personal preference.

Q: Since this was the last auction of Morrow stuff, there's no supply any longer for Morrow parts. Do you have other suppliers you get parts from that can be used on the Morrow MD, or was this the end of the line?

A: I don't think it's the end of the line. We have about 6,000 of the main motherboards for the MD3s and probably 1,000 of the hard disk PC boards. That's enough to support the existing Morrow base for a long time. Basically, we will continue to either have manufacturered or get from somewhere parts for the

Morrow machines until the last one is gone. I don't know how many years that's going to be.

Q: What other stuff do you sell besides Morrows? What are you looking for?

A: Anything I can buy.

Q: How will you go about keeping your business alive after Morrow supplies dry up? What other stuff do you sell?

A: I buy stuff that's cheap and sell it a little more

expensively. It doesn't matter what.

Q: Do you take trade-ins?

A: You saw my car? A 1972 model, I think. Actually, I don't even know how old it is. It's an old beat-up station wagon with dents in the side, which I traded for an MD2 computer. It's an interesting story. This guy came from Norway on an extended visit for a year. In Europe, most people drive small cars, and he always wanted a big American

tank. So he came and he bought this big American tank for $500. And then the engine blew up, so he fixed the engine. And the transmission blew up, so he fixed the transmission. The air conditioning stopped, so he fixed the air conditioner. By then his time in the U.S. was up, and he had to go back to Norway. But he figured he had a fine American car. Everybody's going to want it, he thought. So he stuck a sign in the window of the car saying, "For Sale, $1200." He didn't get even one taker. He came to my store because he needed a computer, which he was going to pay cash for. He was getting on the plane the next day. Well, we made a deal, he took an MD2, we shook hands, I drove him to the airport and came home with my new 1972 car!

Q: What's your philosphy on selling things?

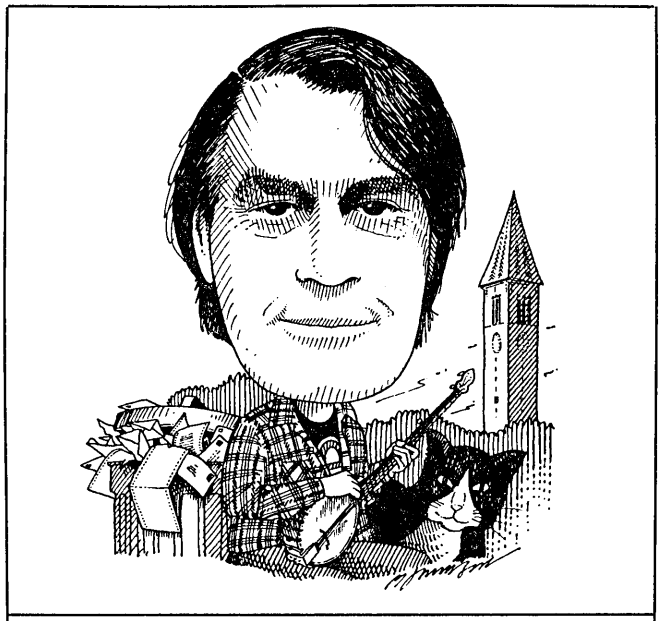
A: I take a mark-up that's suitable for any retail store, 2-3 times. If I buy it for 10 cents, I'll sell it for 20 or 30 cents. Somewhere between there, depending on how many of them I expect to sell. These guys who are holding out for the last nickle and dime, all they're doing is filling their warehouses full of stuff. And at the same time, I don't have to worry about much. I'm not taking a guy's last penny. If I were what they call a smart businessman, I could get more. But I wouldn't feel good about myself. I'm an old hippy. I came into California in the '60s to be a hippy. And the saying we had then was "What goes around, comes around." The old karma theory. And I still believe that, I still believe that as you go through life, if you sow a lot of evil out, it's going to come right back to you. I'm having a good time and I'm feeling good about myself and I'm making money. What else can a guy want out of life?

Q: Do you have Morrow owners trying to sell their old machines to you?

A: Quite honestly, if you want to sell your Morrow, you're better off putting an ad in the classifieds. I want to double. If I give you $200, I want to sell for $400. Well, people don't mind coming to my store and buying an MD3 for $400-500; but when they want to sell one, they don't want to sell it for $250, because they paid $2,000 for it. So when you're buying, you're getting a good deal; but if you come to sell, unfortunately, it's not so good. We'll give you $45 trade-in for terminals. The only reason for that is spare parts. You have a terminal and the keyboard's no good. OK, so the keyboard's no good, but the high voltage power supply's fine. So we sell the high voltage power supply for $29. That means that a guy who can change parts, who's got a broken terminal, can come in and get the replacement part. And we don't even make double on that thing, but it helps the store in the long run because we really want to be able to provide spare parts for all models of machines, and sometimes we have to live on a very small margin on some items just so we have them here. Just so we can have everything. And I think that's been one of the keynotes of our store, we try to have everything--in the Morrow line, that is.

Q: Is there anything you would like to add to the interview?

A: Yes. Thanks to all the customers who allowed me to get this far. If it hadn't been for my customers, I wouldn't have had the money, because I don't have $2,500. That and my name on a lease. I still don't have a bunch of money in my personal checking account. But when the Morrow auction came, I had the money to go get the parts. ■



FROM THE MAILBOX

by Bill Steele

Most people seem to write to the Mailbox soon after they receive MOR in the mail. However, our deadline for the next issue is usually just a week or two after this issue comes out. I get a bunch of mail that is just too late to include, and some people have to wait four to six months to see their questions in print, let alone get answers. So, send in your questions as soon as they occur to you. If you have answers to questions you see in the column, send them in immediately. And write directly to me at the address below; stuff sent to the MOR office just has to be forwarded.

Several readers have had the same problem as Molly McKinney--losing characters during WordStar's word wrap when typing fast--and several different and conflicting answers have been offered. Wallace B. Riley of San Francisco, CA, reports that "The manual says to use the installation program to change the value in the location called DELCUS. This didn't show much improvement and made the cursor "coast" when any cursor-movement key, including Control-G and <Del>, is held down. I found that working with right justification off and the default value in DELCUS works slightly better. I can always justify in a separate formatting step later."

Mr. Riley wonders in turn, "Why does reformatting with Control-QQB stop when it shouldn't and fail to stop when it should? After stopping at a hyphenation point, it finishes the paragraph and quits; at the end of the document, it doesn't turn itself off. I have to press a key to make it quit."

Last month's mysterious caller from Florida turned out to be Nick Mills of Miami, who suggests fixing the word wrap problem by changing the value at label DEL5 (page E-16, in his version of the manual), adding, "It is possible that her terminal has been installed in a way that lets WS load up the terminal, so the terminal is not seeing the keystrokes." Raymond Gastil of Cos Cob, CT, agrees, saying that fiddling with the delays did no good, but when he reinstalled for a Televideo terminal the problem disappeared.

Steve Davalos of Carmel, CA, has some maintenance-related questions: "Can the computer box be stood up vertically (on its side) without harm? Can I leave the computer on all the time (day and night)? Is there an advantage to this? Is there a simple, accurate way to measure whether my MD5 is running hot? Same for MT70 terminal and Epson RX-80 printer: How to measure temperature and whether to leave on all the time or not? How can I check whether I need a replacement fan as advertised in MOR? Are there visual clues? When should I expect to have maintenance work done on my MD5? What are the typical signs? Can I do some of this maintenance myself?"

Whew! The last question, of course, is the theme of this issue. I hope some of the other questions will be answered elsewhere in these pages, but here are a couple of comments. About standing the box on end, the answer I get from the local service agency is, "Well, maybe, but I wouldn't guarantee it; it depends on what kind of bearings they used." As to heat, there are no rules except that "if it's too hot to touch, it's probably too hot." If you've added circuit boards or more disk drives, it would be better to err on the side of caution and put in a fan, or a larger fan, or whatever would upgrade what you've got. I remember reading once that the State of California had spent about $60,000 on a study that showed that if lights in government buildings were turned off for 12 hours out of each day, the light bulbs would last about twice as long. I think that applies here: When electrons are running around inside conductors--and semiconductors--they generate heat; that causes atoms to get knocked around and, occasionally, out of place. Most electronic equipment has a rated "lifetime," and that applies to the time it's turned on. Turning the equipment on and off may use up the life in the on-off switch, but that's cheap to replace. As to when to expect maintenance, don't borrow trouble. You can expect maintenance when something breaks. The signs are that it doesn't work. Always spend some time, of course, making sure that the problem is hardware and not software, or that you haven't screwed things up somehow yourself.

Chester Katz of Washington, DC, says that Julian Ashe's MP100 will not print bi-directionally in Pearl and Smart Checkbook "because the printer drivers for

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We're more on our own than ever, so if you know a solution to a problem, don't assume someone else will write in; there are not so many of us that you can count on that. Whether you have questions or answers, keep them coming: Bill Steele, P.O. Box 782, Ithaca, NY 14851, 607/273-2132, MCI: WSTEELE, 254-5833.

both are equivalent to the WordStar/NewWord draft printer driver--unidirectional." Well, OK, but my Teletext printer runs bi-directionally with the draft driver in both WS and NW.

Mr. Katz also has more on KEY.COM: "If Jon Koerner's MD1E has a Rev. 1 board, I would be amazed that KEY.COM works at all. The program has portions resident in the disk program, the ROM BIOS and the logic board in the terminal. The manual states it will only work on ROM revisions 2.5 or higher. If he has an appropriate ROM, he may have the same problem as Alan Donn and may achieve success with the same fix. I have found that if one tries enough weird key files, a functional one will eventually be obtained."

He adds that the MT70 is a clone of the Zenith Z-22 with a different logic board, and the MDT60 is similarly related to the Zenith Z-29, so any shop equipped to repair Zenith should be able to repair these terminals.

A lot of people have written in thanking us for reporting that the codes for FA-FD unshifted and FA-FD control are reversed in KEY.COM. Jean-Marc Laporte took the "more radical solution" of patching KEY.COM. He found the function key table in KEY.COM starting at about address 0A10, with the offending F10-FD keys defined at 0A44-0A5F. He sent a complete table of his patches, a bit too long to run here, but I'll send a copy to anyone who wants it.

Meanwhile, Douglas Baker in Wilton, CA, got a new ROM chip (Rev. 1.9) and BIOS (Rev. 2.0) through Silicon Valley Surplus in Oakland. Now he finds that KEY.COM doesn't work properly with NewWord and Telecom. With NW, it returns momentarily to the On-Screen Menu and then performs the function. "Slows things down, and is kinda annoying." With Telecom, "Only the first letter in a string appears, but if I keep pressing the space bar, or any key, it will complete the string one letter at a time."

Chester Katz also offers a solution to Jay Kingery, who wants to put a password on the menu in his MD5. Remove the menu from the PROFILE.SUB file and install password protection on the menu file. "It would make more sense to modify the menu file to delete any programs to which he wishes to restrict access. A nice trick is to delete certain programs from the menu screens (such as PEARLDF and PEARLDR) but leave them in the match command." There is a built-in password feature in CP/M 3.0, but Mr. Katz warns not to use it with Pearl files, which are incompatible with the CP/M password file structure. "Once the password is installed, you will be forever locked out of the user areas affected (take my word--I found this out the hard way). It may be possible to work around this problem with a default password (see the Digital Research User's Guide), but try it out on a floppy and not the hard disk."

Mr. Katz has some questions of his own. "Has anyone written a generic program to activate the DEVICE command of CP/M 3.0? The MD5 and MD11 manuals state that the auxiliary port is not supported. If you try to use the DEVICE command, you are shunted to a trap program that tells you the function is not implemented. My motive for wanting to use the aux port is that my MD5's serial port will not recognize a busy signal from the printer, forcing me to use a very low baud rate. I suspect that SETUP could be easily modified."

Priscilla E. Muller of the Hispanic Society of America in New York City suggests a Spanish language spelling checker for Roberto Villarreal: "Escribie'n" from Ibersoft, P.O. Box 3455, Trenton, NJ 08619, 609/890-1496. Ms. Muller would also like to find a user's group in the New York area.

Rick Graham II of Sylmar, CA, is using Quest on an MD3. "When we first tried to delete a one-time customer from our Accounts Receivable, we got an error message. I called the people at Quest and they admitted it was a bug, but a low priority bug. Do any readers know about this or how to correct it?"

Frank Sokar at 1327 S. Main St., Elkhart, IN 46516, would like help getting MEX.COM running on his MD11 under CP/M 3.0, using the auxilliary port. He has Crosstalk running on the aux port (which frees the printer port and does away with the need for a switch) and would be happy to help others with that.

Michael G. Kellogg and David Lindberg in Concord, CA, point out that the CP/M TYPE command will send a file of control sequences to the terminal. After preparing the file, enter at the A> "AUTO TYPE <filename>" and the file will be sent to the terminal on bootup. You can then erase AUTO.COM, and the total overhead on the disk will be only 2K. "You can also add text to the initialization file to provide messages, instructions or options. This is particularly useful on disks used by others, on disks with several programs and for programs most often run with options on the command line," they write. "Of course, you still need SUBMIT.COM and/or PIP.COM to initialize the printer or to initialize the terminal and load a program."

They also report that NW Vers. 2.xx (i.e., any version beginning with "2") does have printer initialization and uninitialization strings, labeled ULINI and ULUNI, both accessible through Special Patches Menu #3 of NWINSTAL. As near as I can find out, these don't exist in the 1.xx versions.

I have a question of my own. My Mite software with the MM300 modem refuses to work in the answer mode, although the auto-answer function of the modem works fine in direct-connect mode. I'm wondering if anybody else has this problem. Neither CTS nor Mycroft Labs can offer any solution; according to Mycroft, the software sends no signals to the modem when it goes into answer mode. ■

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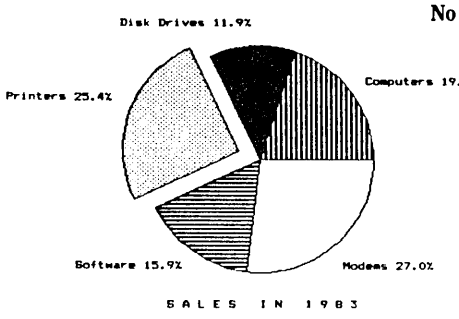

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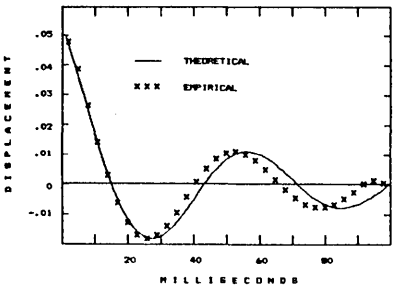

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Your Disk Drives: To Clean or Not to Clean?

by Dave Grothe

Since its invention by IBM more than a decade ago, the floppy disk drive has become the most common mass storage device for microcomputers. And yet, many microcomputer users are unaware of the best techniques for keeping their drives in proper working order.

Floppy disk drives are designed to be reliable and maintenance-free. In fact, the service manuals for the Shugart SA200 (single-sided drive) and SA455/465 (double-sided drive) both specify that periodic maintenance is not required. In spite of this fact, many manufacturers of computer supplies produce--and vigorously market--floppy disk drive head-cleaning kits. These kits are intended to remove magnetic oxide residues that their manufacturers claim build up on the disk drive's read/write heads after many hours of contact between the heads and a rapidly rotating floppy disk. But the virtues of these kits are dubious for a number of reasons.

First, the entire floppy disk drive system is designed to minimize loose dust, friction, media wear and the build-up of oxides on the read/write heads. Inside each floppy disk is a lubricating liner, nestled between the mylar disk itself and the protective vinyl jacket. The liner keeps the disk lubricated so that it can rotate freely, and also traps any loose dust or oxide particles so they won't come between the mylar disk and the read/write heads. Both the floppy disks and the read/write heads are finely polished during their manufacture to produce a low-wear interface.

Second, even if trace amounts of magnetic oxide were to build up on the read/write heads, chances are that it would not interfere with the operation of the disk drive. The manufacturers of cleaning kits often draw a parallel between the recording technology used in floppy disk drives and the recording technology used in consumer audio products, such as a stereo cassette deck. They imply that if the cassette deck's record/playback heads require periodic cleaning to preserve audio fidelity, then the floppy disk drive's read/write heads should be cleaned regularly to preserve the integrity of your data. But the fact is, the two recording technologies--despite their outward similarities--are quite different. The cassette deck records analog signals, while the floppy disk uses digital recording, a process that is largely immune to minor degradations in signal strength.

Third, and most important, it is possible to damage a floppy disk drive by cleaning it improperly. The greatest danger lies in using a wet process cleaning kit with single-sided drives. Single-sided drives, like the ones in an MD1 or MD2, have a small load pad that gently presses against the bottom surface of the mylar disk in order to keep the top surface in contact with the read/write head. This load pad is often made from a porous material. If it absorbs any excess cleaning fluid, it can swell enough to throw the read/write head out of alignment, causing the drive to malfunction.

Double-sided drives are less susceptible to damage from a cleaning kit because they don't have load pads. Instead, one read/write head is mounted on each side of the disk, and each head acts as a load pad for the other. Even so, I don't recommend the periodic use of cleaning kits on double-sided drives; I'm a firm believer in the sage advice, "If it isn't broken, don't fix it."

On the other hand, if your disk drive suffers a genuine malfunction, and the problem cannot be traced to operator error or a worn floppy disk, by all means try cleaning the read/write heads before taking your computer to the shop for repairs. You just might save yourself a repair bill. And if you do clean your drive's read/write heads, use a dry process cleaning kit. It won't abrade the heads, but it will avoid introducing potentially damaging cleaning fluids into the interior of the drives. Dry process cleaning kits are available from a variety of manufacturers; I purchased one from Spite Software (4875 Southwest Nineteenth Drive, Portland, OR 97201; 800/824-7888).

Finally, the single most important factor contributing to reliable disk drive operation is the use of quality media. All floppy disk brands are not created equal. Some are definitely better than others, and price is not always the best indicator. For example, in a study published in the September 1984 issue of BYTE, Robert Rodine found that Nashua brand diskettes, which now retail for about $1.00 each, had greater recorded signal strength and a more highly polished disk surface than 11 other major brands. These traits are important, inasmuch as recorded signal strength affects the reliable recovery of recorded data, and the degree to which the disk surface is polished affects the rate of head wear. ■

Dave Grothe is a regular contributor to the Morrow Owners' Review.

Unsqueaking Your Keys

by Ken Grymala

My keyboards get a real workout. About once a year, I notice that some of my keys are starting to stick and--worst of all--they start squeaking. It really drives me crazy when this happens, but luckily, there's a simple solution.

When your keyboard keys start to squeak or stick, it's not hard to unsqueak and unstick them. And cleaning your keyboard can be a real eye-opener. You'll be surprised at the junk that you'll find under the keys--hair, dust and lots of other yuck!

I have an MDT50 (Liberty Freedom 50) and an MDT60, and both have had sticky or squeaky keys at one time or another. To unsqueak them, all you need to do is l-i-g-h-t-l-y lubricate the key shafts.

A keyboard is made up of push-button switches soldered to a Printed Circuit (PC) board. Each switch has a keycap that has the letter, function or number engraved on it. The keycaps fit on the shafts of the push-button switches. To lubricate the switch shafts, the keycaps should be removed.

It is possible to remove the keycaps without taking the keyboard apart, but I find it easiest to take them off when the keyboard cover is not in the way. Besides, taking the cover off gives you a chance to clean out all the junk that has collected inside your keyboard housing.

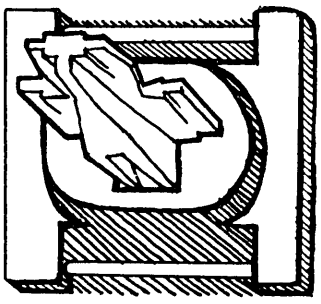

Figure 1. With the keycap removed, the switch stem is exposed for lubrication.

For almost any keyboard, all you have to do is remove the bottom screws, and the keyboard will come apart into a top, a bottom and a keyboard. Make sure your keyboard is disconnected before you start.

Once you have the case off, you should clean out all the dust and other debris that has collected. You can do this easily, using a soft-haired paintbrush and a vacuum cleaner. Use the paintbrush as you would use a broom, and suck up the dust and debris by holding the vacuum cleaner hose about an inch away from the brush.

To lubricate the keys, remove the keycaps. The keycaps are very easy to remove, but be very careful and pull only straight up. If you don't pull straight up, you may break the switch shaft, and the switches are not meant to be replaceable. [If you ever do break a keystem, read Susan Parks' article on page 21 for ways to repair it. --Ed.]

Before you start, make sure that you have a diagram of where the keys belong. If you don't have one, draw one, at least of the special keys like backspace, delete, reset, etc.

Now you're ready to start removing the keycaps. I find it easiest to start by removing about a dozen keycaps at a time and working my way around the keyboard.

You will need a spray lubricant such as WD-40 or LPS-1. My favorite is LPS-1 because it is lighter and has less odor than WD-40. LPS products can be found at most industrial electronic stores and stores that supply television repairmen. WD-40 can be found at most hardware stores.

Even though I recommend spray lubricants, do not spray the keys themselves. Instead, spray a cotton swab and then rub the keystems with the swab. Too much lubrication can attract dust and make matters worse that they were. So don't over-lubricate!

After you've lubricated each of the switch stems, put the keycaps back on and re-assemble the keyboard. If you do as much typing as I do, you'll be surprised at how good the keyboard feels after it is cleaned and lubricated.

My keyboards get approximately 1,000 hours of typing per year, and they only need lubrication and cleaning about once per year in an office of non-smokers. If you've got smokers or lots of dust, you may need to do this more often. A dust cover wouldn't hurt either. ■

Ken Grymala is a frequent contributor to and columnist for MOR.

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MT70 Key Repair: Swab the Keyswitch and Type On

by Lee McKusick

Have you spilled coffee on your keyboard? Have some of your keys quit working? Is your keyboard flaky when the humidity is high and the room is cold?

If so, then maybe what you need is a keyswitch cleaning. Although it sounds intimidating, cleaning your keyswitches is not very difficult, can be done in a short period of time (you can clean a key in five minutes, which is helpful if you are writing against a deadline) and will save you money because you'll be doing it yourself.

The keyswitches I cleaned were on the MT70 keyboard, also known as the "Zenith keyboard," which was supplied with the MD3-P and other late models of Micro Decisions. This method will not work on MDT60s and MDT20s, though. [For cleaning MDT20 keyboards, see the sidebar. --Ed.]

The MT70 keyswitches use a conductive rubber bump that gently bridges two brass contacts. The keyswitch fails when a light film of oil, oxide or moisture covers the brass contacts, but you can fix it by rubbing the brass with degreaser and a swab to "degrease" the contacts.

Supplies Needed

A piece of dental floss or fishing line (approximately 1 foot long) for lifting off the keycap.

A small knife or screwdriver with 1/8-inch blade for releasing the latches on the sides of the keyswitch.

Cotton swabs for wiping the switch contacts. Test that your degreaser does not dissolve the swabs.

A can of aerosol electronic contact degreaser such as Chemtronics ElectroWash C240, Radio Shack Cleaner/Degreaser 64-2322 or Dick Smith Electronics Spray Cleaner N-1051. Freon degreasers work best but cost the most. If you don't want to get a freon degreaser, you can try 98-percent denatured ethanol, which is sold by some drug stores.

How to Clean a Keyswitch

Step 1: Remove the keycap.

The keycap is the part of the key that you press when you type. It's sort of like a hat sitting on top of the keyswitch.

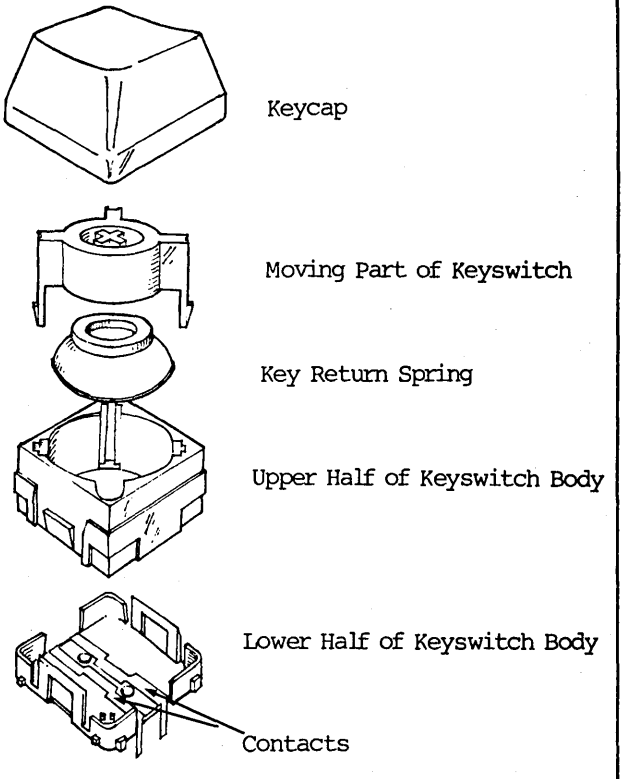

Figure 1. Exploded view of an MT70 key.

To remove most keycaps, loop dental floss or fishing line underneath the keycap. Then draw the keycap straight up and off the keyswitch, being sure to pull with equal pressure on both sides of the line.

Lee McKusick uses a Morrow MD3-P to learn computer science. He hopes to make technical writing, typesetting and programming in Pascal, dBase and C his next career.

Be careful when removing the space-bar, Return, Enter, Control and keypad 0 keycaps, however, as these have a wire bail that steadies the big keycap over the keyswitch. To remove these, draw the keycap straight up gently, being sure not to bend the wire bail.

Step 2: Expose the contacts.

The keyswitch is that black square gadget you just exposed. Press it and see how the center part with three legs moves. Isn't that cute? (See Figure 1.)

Now look down around the center part and see the gray rubber doughnut. That gray rubber doughnut is the key return spring.

The underside of the gray doughnut is coated with black conductive rubber. This conductive rubber bridges two contacts in the bottom half of the keyswitch. Good keyswitches show 80-200 ohms resistance when pressed.

Now, to get to the contact, you must open the keyswitch. To do this, you need to spread the latch loops. These latch loops are difficult to see when the switch is together, however.

Find the fine cracks marking the latch loops. With a knife tip or small screwdriver, spread one latch 1/16-inch (a tiny amount) and rock the upper switch body up. Gently spread the other latch and rock the other side up. Repeat until the upper half of the keyswitch body pops loose.

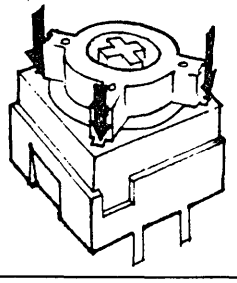

Figure 2. Arrows indicate where the needle should be inserted to remove the Caps Lock and Enter keyswitches.

This works for all keys except the Caps Lock and Enter keys. You noticed how the center part of the exposed keyswitch had three legs? Well, the fourth corner is a cutout for a keylight, and there are keylights under the Caps Lock and Enter keys. These two keys cannot be opened by unlatching the upper half of the keyswitch body, as you did with the other keys. Here, you must slide a needle down each of the three legs and unhook the moving part from the keyswitch body by pushing down. (See Figure 2.) It's a little like removing a fish-hook from your mouth.

Step 3: Clean the contacts.

Now wash all keyswitch parts with degreaser. Rub the brass connectors with degreaser and the swab.

It seems that rubbing the brass connectors with a

Cleaning the MT20 Keyboard

The MDT20 keyboard does not have sealed switch contacts, and many owners have found that after two years or so some of the keys stop working due to dirt and dust getting between the contacts.

To clean the keys, open the case, remove the board and remove the keycaps.

Do not attempt to blow the dirt out! You stand an excellent chance of actually blowing more dirt into the contacts. Instead, vacuum. You can use a small brush to get accumulated dirt off the board around each key, but be careful not to brush it into the slots surrounding each key.

If vacuuming doesn't correct the problem, you can attempt to clean out the contacts with a solvent. Electronics stores have contact cleaners that might work, but you might have to try several different solvents to find the one that will solve your particular problems (use them one at a time; do not mix them). Be sure that either the solvent is marked as safe for plastics (you do not want to damage the board or any plastic parts) or test to see that it does not soften the board material (place a drop on an edge where there are no traces).

As you soak the contacts, pound and wiggle the keys so that a rubbing action between the contacts can dislodge the dirt. Sometimes simply pounding on the key a lot will squash or break through whatever is between the contacts. (Don't do this before vacuuming--you don't want to lodge the dirt in place.)

Even if you have not yet had any problems with your MDT20, I suggest you "upgrade" by adding a dirt-catching membrane between the keycaps and the board. With all the keycaps off, smoothly lay some thin plastic (a cut-open freezer bag works fine) over the keystems and tape it in place. Mark the location of each key stem on the plastic with a permanent marker. Remove the plastic and use a knife to slit the plastic at each mark. Then press it down over the key stems and trim off any excess around the edges. Plug the keyboard in, and test each key. If the plastic makes adjacent keys move or badly affects the touch of the keyboard, enlarge the slit for that key. When it is working properly, replace the keycaps and re-assemble the keyboard. If you are already having key problems, this is a little like shutting the barn door after the horse has fled, but it can't hurt.

--Bruce Gowens

swab is essential to fixing the switch. I suggest rubbing only; no abrasion and no polishing. And I recommend that you resist the temptation to fuss with the conductive rubber doughnut.

Now, wait until all the keyswitch parts are dry. Once they are, you can re-assemble the keyswitch. To do so, line up the keyswitch light holes (the holes on the fourth corner) and press the upper half of the keyswitch body down until the latches close.

Then test the switch. Some keyswitches, for reasons unknown, require cleaning twice.

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The Two Best Ways to Repair Your Broken MDT20 Keystem

by Susan Parks

It's been a few years since I first laid my hands on a microcomputer keyboard. Our school district held summer in-service training for the purpose of acquainting principals with microcomputers and their uses in schools. The computers were TRS-80s, most of them tape-driven. Apple had not yet donated its free computer to every school, and most of the computers came with 16K. I saw my first "floppy" and was treated to a demonstration of VisiCalc "crunching" numbers, although at that time I didn't know that diskettes were called floppies and that numbers could be crunched. Before the morning ended, I was happily computing away, silently figuring out how to convince my husband that we really just had to have a computer at home.

One of the selling points of a microcomputer for home use was its relative indestructibility. Wishing to allay our fears, our instructor showed how it was "impossible" to destroy or even damage the computer. He banged, whapped, hit, knocked and thunked that computer, even banging on and dropping the keyboard right before our very eyes; fearing the worst, we winced with every blow. "You cannot hurt this," he assured us, and because that microcomputer worked after its rude treatment, it appeared that he was right.

Unfortunately, he had never met our 4-year-old granddaughter, Megan Kate. Megan broke a key off our Morrow MDT20 keyboard, and she wasn't even using the computer at the time.

Megan was talking with Great Grandma, using the phone atop the modem, which sits on a triangular corner shelf above the MD3's monitor. Our kids, ages 11 and 14, like to use that particular phone; the stool is comfortable, and it is away from the kitchen and laundry room, meaning it is somewhat away from parents, too! Our teenager dialed the phone and, after talking a bit, gave the phone to Megan. Before anyone could blink, Megan said, "Want to talk with Great Grandma?" and ran across the room with the receiver. Needless to say, the phone pulled off the modem and crashed down to the keyboard. The damage was a broken keystem, the letter "C." Fortunately, it was a clean break--no tiny chips to recken with. Naive as I was, I thought I'd just get it fixed the following week. Was I wrong!

After calling computer repair businesses in the Yellow Pages, we finally found someone who was willing to look at it. We were told that he would need to keep the keyboard for a couple of weeks and that he wasn't sure about parts, anyway. As we were leaving, his wife told us quietly that sometimes they just glued the keys anyway. Why didn't we try that? That seemed simple enough, and it did work for four months. Then, the key started sticking once in a while, filling the screen with CCCC

switches. He did not have a replacement keyswitch, but he did fix the broken "C" and took time to show me what was needed, step by step. It could be done by someone at home, depending on how steady you are with things like this.

But before trying his replacement method, which involves soldering and desoldering, you might want to try gluing the stem first. After all, my glue job lasted four months, and a colleague just recently told me that his glued keystem has held for three years now. Remember, super glue holds elephants on television, so I suspect a glued keystem should hold forever if done exactly right.

To Glue Your Keystem

1. Clean both ends of the broken keystem, using alcohol on a cotton swab. Don't allow the alcohol to drip into the inner workings.

2. Use a gel-type super glue. It is easier to work with, giving you greater control and less risk of dripping glue.

3. Read the instructions on the glue package. Gel-type glues usually have a coverage of one drop per one square inch. Don't use too much.

4. Make a circle of masking tape with the sticky side facing outward. Stick this tape firmly to your keycap.

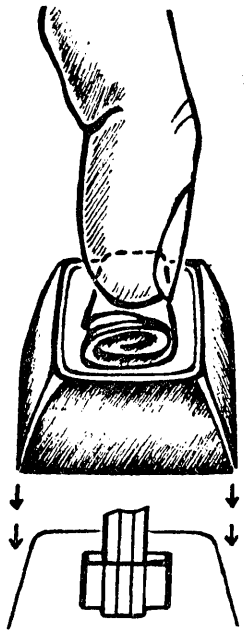

Figure 1. Masking tape (with the sticky side facing out) can be used to hold the keycap in place while gluing the broken keystem.

5. Hold the key by sticking your finger on top of the tape on the keycap. (See Figure 1.) Then, position the key on the keystem, using the glue according to package directions. Hold until set.

6. Leave the tape on the key until the glue is completely set (but you can remove your finger--carefully!). Try leaving the tape on overnight, just to be sure.

If this method doesn't work for you, though, or if you are more mechanically inclined than I am, you might want to try Jeff Clark's system. Because we could not locate a replacement keyswitch, his method of fixing the key involves substituting the keyswitch from another key on your keyboard. (I used the F1 key, as it gets virtually no use by me.) If you're luckier than I was and can locate a replacement keyswitch, though, his method will show you how to install it. [Replacement key switches can be purchased at Silicon Valley Surplus, see p. 9. --Ed.]

To Replace Your Keystem

For this repair, you will need: a soldering iron, one blade and one Phillips screwdriver, a steady hand, and either a desoldering tool or desoldering braid. Here's how to do it:

1. Unplug your computer!

2. Detach the keyboard.

3. Set the keyboard upside-down on an old soft cloth or newspaper on a firm work surface.

4. Remove the four screws on the back. Lift the keys and board out of the casing.

5. Remove the screws holding the keys and board to the rest of the casing. You may need to remove screws from a metal plate holding the cord in place.

6. At this point you are ready to begin the actual repair. First, you will need to remove the broken keyswitch from the board. This unit has two flat, metal prongs that plug into the board and are soldered to the back side of the board. Before you turn the unit over so the soldered side is up, be sure you determine which soldering belongs to the key you want to remove. Don't operate on the wrong keyswitch!

7. Now, desolder the keyswitch's two prongs. This step takes the most skill. Jeff had desoldering braid, but, instead, he used a desoldering tool, a vacuum plunger. After using a soldering iron to heat the solder, he then sucked up the liquid solder in the vacuum plunger, keeping it from running or smearing on the board. When this step is complete, turn the keyboard over so the keys are facing up.

8. Now, having removed the solder, you can work on extricating the keyswitch. The unit sits in a square hole and is held firmly in place by two plastic "wings" or phlanges. (See Figure 2.) To remove the switch, squeeze the wings together and

lift the unit. When we did this, it took patience and a screwdriver to gently lift the edges of the switch, which then unplugged from the board. Be careful not to break something else while doing this. Take your time and pry gently as needed, perhaps giving yourself more working room by lifting off several of the surrounding keycaps.

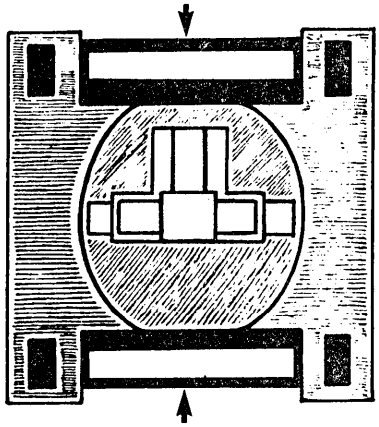

Figure 2. Arrows indicate the two plastic phlanges that hold the keyswitch in place. The desoldered keyswitch can be removed by squeezing these phlanges and lifting.

At this point, if you've bought a replacement keyswitch, skip to Step 10. Otherwise, proceed to Step 9.

9. Repeat this procedure with the keyswitch of your choice. Remove its keycap by lifting up; it should lift easily. Then, following Steps 6-8, desolder and remove it from the keyboard.

10. Now place your replacement keyswitch (whether bought or "borrowed" from elsewhere on your keyboard) in the spot from which you removed the broken keyswitch. Carefully plug it into the board. After it is plugged in, solder it, using the other soldered keyswitches on the board as your model. When that's done, put on its keycap--and the key is fixed!

If you "borrowed" the switch from another key, this leaves you with a hole in your keyboard; but it should function properly without replacing the keyswitch. If you want to fill in the hole, though, you can either wait and get a new switch or put the broken keyswitch there, giving it the old gluing technique.

In closing, Jeff Clark has indicated that he would be happy to talk with anyone needing help as long as it's understood that home computers are not the main area of his business expertise. You can reach him at Pacific Microsystems, 805/522-9108. ■

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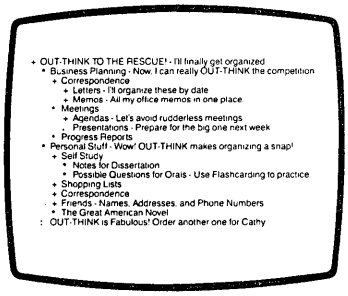
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Auction at Morrow

by Sypko Andreae

One day George Morrow announced the birth of his new company--Intelligent Access, Inc.--and the next day rumors flew about a Morrow auction. Then it was official:

By Order of Secured Creditor

PUBLIC AUCTION

COMPLETE LIQUIDATION

MORROW ■ DESIGNS, INC.

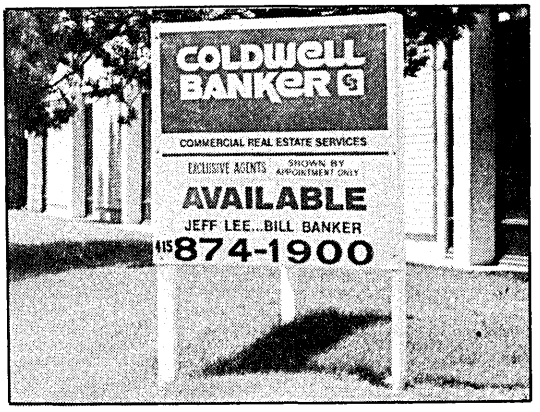
600 McCormick Street

SAN LEANDRO, CA

TUESDAY, JUNE 24

11:00 A.M.

Union Bank of Los Angeles, which had taken control after Morrow filed Chapter 11 for reorganization under federal bankruptcy laws several months ago, still had to recover nearly $5 million. People in the know estimated that the auction might bring in $2 million, more likely less. Who would come to buy the remnants of what was once a flourishing company? Where would it all go? It seemed worthwhile to go and take a look.



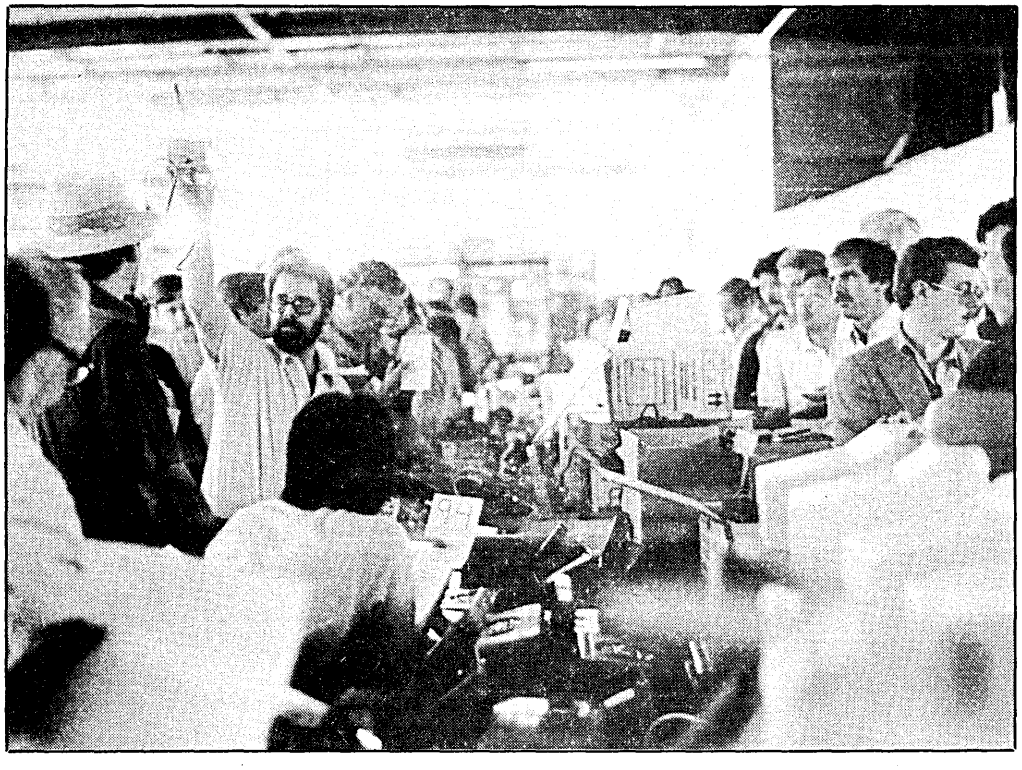
Signs on yellow notepad paper showed the way inside the Morrow plant: "Sale starts here -->." By 11 a.m. there was a small crowd assembled in Morrow's former manufacturing hall. Everyone was leafing quickly through the 11-page auction catalog that listed over 700 lots, with a short description of what was in each lot. All of the hardware was laid out on tables and benches, an overwhelming amount: rows of ADM-20 terminals, stacks of MT70 terminals, which had been so hard to find up till now. How did Morrow hold on to all this stuff so long?

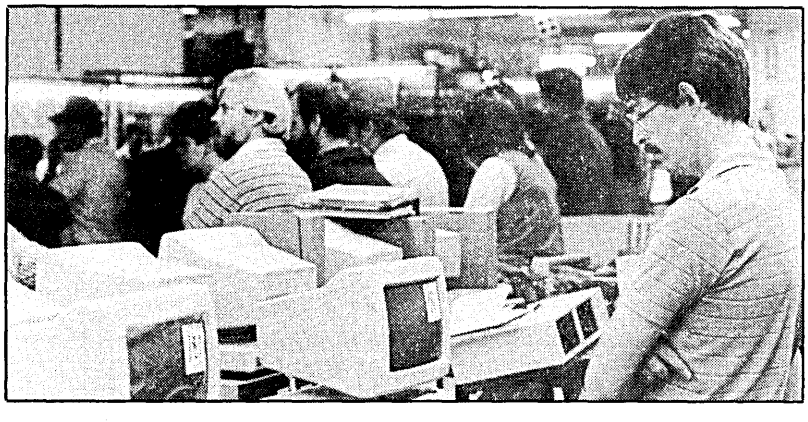
Everything went under the hammer: tool boxes, soldering irons, test equipment, Tektronics scopes, old Pivots (model Is; there were no Pivot IIs anywhere), about 60 MD3s--with or without MT70 terminals--in lots of one or four or eight. One fellow from the Midwest bought all of the MD3s at an average cost of $225; not bad. I got his business card thinking that I might refer MD3-seeking MOR subscribers to him, but he said all those MD3s were already spoken for.

The MD5s, with or without MT70 terminals, fetched amazingly high prices. At first they sold for about $550, with terminal; then, as the hours passed, a true MD5 frenzy set in and the price went up and up until the last lot of MD5s--without terminal--sold for $750 each!

There were MP200 and MP100 printers, all kinds of lesser-known software packages, an IBM PC/XT, a Sol computer, rows and rows of MD3-Ps, and even MD2s with ADM-20 terminals, software and manuals that went for $175 total. Don't you wish you had been there to pick up a little something? If you had wanted to bid, you had to be fast. The auctioneer was quick and sold things in the wink of an eye. Of course, he had to hammer away over a thousand lots in a single day.

After the benches, shelves and forklifts were sold, the crowd of some 100 buyers moved to the cafeteria. The auctioneers, stately sitting in their tall lectern on wheels, were slowly pushed along.. There was great interest in the microwave oven. Some Japanese gentlemen, whom I had all along suspected of coming to buy every Pivot in sight, bought the entire set of chairs and tables instead.



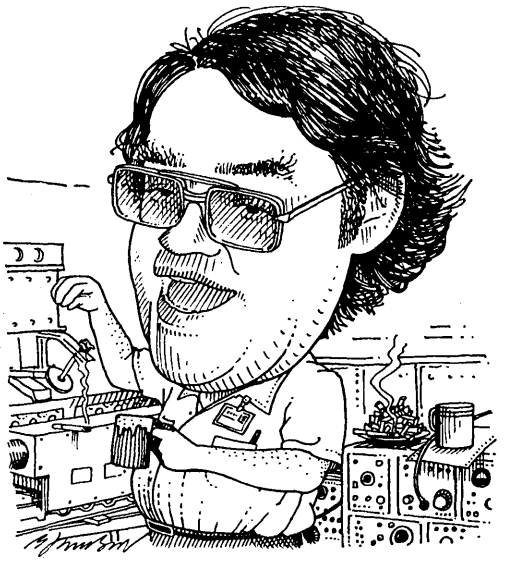


Then it was back to the hall again, where a loud argument was in progress. "He's swapping my good probes for his bad ones!" shouted an indignant Tektronics buyer. The auction stopped, the movable auctioneers' throne was wheeled to the spot of the commotion and the chief auctioneer turned judge, using the same firm gestures he had used all day. Soon all was settled. He gave a stern warning that no one touch any more of the equipment. The auction crew made barriers around all the "items-sold" areas with long ribbons of surplus stickers that read "Defective equipment, do not ship," which made a few jaws drop.

Where have all the spare parts gone? Most of the items were spread around the globe. They went to individuals, computer stores, repair shops, junk yards. Later I checked with Brian Whittaker, owner of Silicon Valley Surplus, so far the Morrow owner's best source for parts. He told me with pride that he had gotten most of the spare parts and could supply Morrow users for a long time to come.

And what about complete Morrow systems? Look for small ads to appear soon in classified ad sections all over the Bay Area and beyond. The asking prices will be double the prices paid at the auction and will still be utterly reasonable for what you get. Years ago George Morrow lamented that personal computers cost far too much and should be about the price of a TV set. That time has come now, albeit a little earlier than he expected.

Morrow's doors were closed forever a few days after the auction. The Coldwell Banker "Available" sign went up. The last of the 11 remaining Morrow employees were terminated. Now it is just us, some 30,000 Morrow users, with this magazine to support some 4,000 of us. We'll just keep going. We know we have decent machines that will run for years. ■



TOOLS FOR TYROS

by Mike Allen

A note before I proceed with the column: I have been under-whelmed by mail. This column is based on a two-way information flow. I need to know what yo want to know. Also, I need to know if what I'm doing is right. Please, people, let me or MOR know how I'm doing!

OK, ever onward. In the last column I said that we would explore memory, I/O and CP/M a little more. I'm afraid that there is no way to do this without some understanding of the binary number system. I'll try to make it as painless as possible.

Computers deal in numbers. Even the characters displayed on your terminal are numbers to the computer. The basic number that a computer uses is a binary digit, or a "bit." A bit can have only two values: 1 or 0, on or off, yes or no, etc. Eight of these bits are combined to form a "byte."

In order to understand how this works, let's learn how to count to 255 using only eight fingers. Pull out a felt-tipped pen and label your finger-nails as shown in Figure 1. Don't bother to label your thumbs.

Now add up all the numbers on your fingers. 255, right? Curl all your fingers down. You don't see any numbers. That's zero. Hold up the fingers on your right hand. Add up the numbers. I hope you got 15. Try only the little fingers of each hand. Adds up to 129. By using different combinations of fingers, you can get any number between 0 and 255. Each finger represents a bit, and both hands represent a byte.

Send your questions and comments to Mike Allen, c/o MOR, P.O. Box 5487, Berkeley, CA 94705, or c/o Westinghouse, 7121 Standard Drive, MS 6080B, Hanover, MD 21076.

(One hand would represent a nybble. Ain't that cute.) The little finger of your left hand is called the Most Significant Bit (MSB), and the little finger of your right hand would be the Least Significant Bit (LSB). The LSB is also known a bit 0 and the MSB as bit 7. Bits 1 through 6 are those in between.

The CPU in the MDs (a Zilog Z80) deals with 8-bit data. Data are stored, input and output in bytes. Instructions for the Z80 are in the form of one or more bytes. Your terminal, printer and modem all work with 8-bit bytes. So do your disk drives.

As you remember, the CPU operates on instructions stored in memory. The memory in your MD is Random Access Memory (RAM). What this means is that all those bytes of memory are organized like a bunch of mail boxes. If you know the address of one of those boxes, you can retrieve the byte that is in that box or put a new byte in it. Putting a new byte into the box will destroy the old byte that was there.

Addresses, too, must use binary numbers. However, eight bits of address would only give us 256 bytes of memory. We couldn't do much with that. (It is amazing what you can do with small memories, though. My first computer only had 1,024 bytes of memory.) So, for addressing purposes we use 16 bits (two bytes). This gives us 65,536 bytes of addressable memory. "Wait a minute," someone says. "An MD3 has 64K of memory. 'K' is short for kilo, which means 1,000. Where did the extra 1,536 bytes come from?" Weeeell, it is confusing. Us electronic types are used to ordering a 1K-ohm resistor and getting a 1,000-ohm resistor, not a 1,024-ohm resistor. As it turns out, 1,000 is not a nice, even binary number; 1,024 is. So, someone (damned if I know who) decided that "K" in computerese would mean 1,024 and not 1,000. If you take 65,536 and divide it by 1,024, you get 64, 64 computer-K of memory. (Atari is fighting this. Their 520-ST has 512 computer-K of memory, which is 520+ normal-K.)

OK, let's summarize. Data (and this is a general classification; data include programs, characters and numbers) are stored in memory in chunks of eight bits. The addresses of each of these chunks use 16 bits. There are two basic connections between the CPU and memory: 16 bits of address and eight bits of data. These are referred to as the "address bus" and the "data bus." There are actually 24 copper paths on the printed circuit board between the CPU and the memory for these buses.

Now, how is this memory used? Remember that your operating system (CP/M) is always loaded and running. The bottom 256 bytes (1/4 K) of memory is reserved for CP/M. Also, the top 9K is used by CP/M. If we subtract this 9-1/4 K from the total of 64K, we have 54-3/4 K left for us to use. Your applications program will use part of this memory, and the remainder can be used for data. You guys with the hard disk MDs have 128K to play with. Things get a little tricky there since your CPU isn't capable of

addressing more than 64K. The operating system (CP/M 3.0, also known as CP/M Plus) swaps chunks of memory back and forth, fooling the CPU into thinking that it is only addressing 64K. This is called "bank switching." Kinda like having the same P.O. Box number in several different ZIP codes.

Enough on memory for right now. How do we get data in and out of the computer to the peripherials? Well, that's what the I/O is supposed to accomplish. There are two basic types of I/O: parallel and serial. The hard disk MDs and the Rev. 2 floppy MDs have two serial and one parallel I/O channels. The Rev. 1 floppy MDs only have the two serial channels. These I/O channels are referred to as "ports." I am ignoring the disk I/O since most of us will never be aware of it anyway.

A parallel port is one where all eight bits are transferred at once. There will actually be a wire for each bit that is sent or received. This tends to be the fastest kind of I/O.

A serial I/O port is one where the data is sent out or received one bit at a time on the same wire. The speed at which the data is transferred is called the "baud rate" (named after Baudot, the guy who invented the original teleprinter code). A baud is really a bit per second. So 1,200 baud is 1,200 bits/sec. Serial I/O is a little more complicated than just squirting out the eight bits. The device on the other end of the channel needs to know when the byte starts and stops. Two more bits are added for this purpose: the start bit and the stop bit. So to get eight bits of data transferred, we actually transfer 10 bits. Hence the actual data transfer is a little slower than the baud rate. At 300 baud, you would actually be transferring 240 bits of information per second.

I/O is a little more complicated than what I have described. There is also "hand-shaking." For instance, if we send data to the printer, the computer needs to know that the printer is ready to receive the data. There are many methods of hand-shaking. One of the simplest is just another wire that goes in the opposite direction of the data, which tells the sending device that the receiving device is ready. This is used on both serial and parallel ports. Another method, commonly used on serial ports, is to make the port bidirectional. This means that the port can send and receive data. Data are sent out until the receiving device sends a special character to the sender. Then the sender stops until another special character is sent by the receiver that says, "I'm ready for more data." The common characters used for this are a Control-Q, called XON, and Control-S, called XOFF. This system is often referred to as an "XON/XOFF protocol."

I snuck a new term in that last paragraph--a control character. All this means is that you hold down the "CNTRL" key on your keyboard and then press another key at the same time. So to send a Control-S

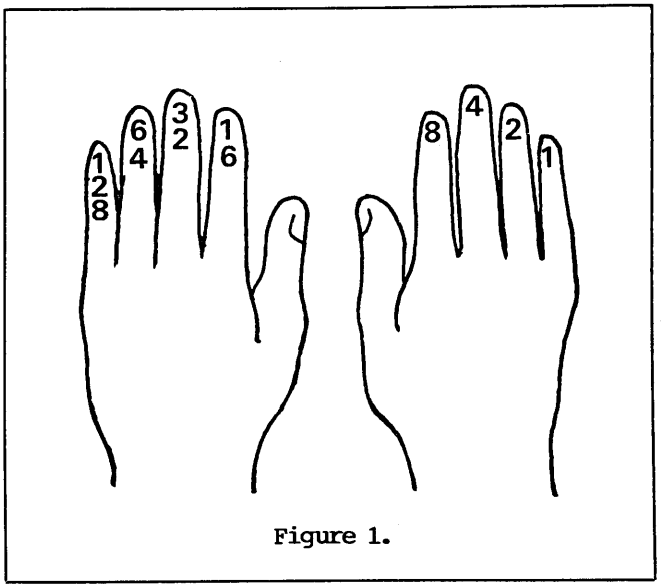


Figure 1.

you would press the "CNTRL" key and the "S" key at the same time. This is commonly represented in text as the letter preceded by a caret. So a Control-S would be shown as "^S." As an aside, you remember that I said that the computer treated characters as numbers. The number that represents a Control-S is 19, "S" by itself is 83 and "s" is 115.

What are the ports on our MDs used for? Well, there is always one port assigned to the terminal. This is a serial port that runs at 9,600 baud. It uses XON/XOFF protocol. The second serial port is for you to use as you see fit. If you have a Rev. 1 machine, this is the only other port you have, and it most likely will be hooked up to your printer. You can also connect it to your modem, but to do that you'd have to disconnect the printer. The speed and hand-shaking method would depend on the device you were connecting to.

If you have a Rev. 2 or a hard disk MD, then you have a parallel port to play with. Most likely, you'll have this port hooked to your printer. Most printers come with what is called a "Centronics parallel port." This was the interface used early on by the Centronics printers, which were the first widely used printers that used parallel data transfers. This interface has now been adopted as a standard by the industry. Our MDs with parallel ports are all set up as Centronics parallel. That leaves the second serial port. The most common use is for a modem, although I have seen a second printer connected to it. This is a nice way to switch between a fast but not pretty printer for getting draft copies and a slow but pretty printer for the final copy.

I'm running out of space and I haven't said much about CP/M, nor have I talked about the STAT command that I asked you to try. Next issue, I'll give you the answers to that STAT command project I gave you last month. ■

Keeping Your System Alive: Minor Crises and How to Prevent them

by Ken Grymala

If your computer system hasn't already failed, you are very fortunate. We've got two complete computer systems, and in the past four years we've had about four serious failures and a number of less serious failures.

I'm probably more fortunate than most computer owners since I'm an engineer, I have a full set of technical manuals and I have lots of test equipment right in the same area as our computers.

Even so, when something dies, my first reaction is full-scale panic. And inevitably, the computers have failed at the most inopportune times.

Cables

One problem that we've had, and that I know a lot of other people have had, is with cables.

A good friend called me in great distress one night to tell me that he moved his MD5 and printer from his home to his office, and that he no longer could print.

Luckily for him, he just had the connector on upside down. This is very easy to do if you are using the parallel printer port. The connector on the computer is a symmetrical edge connector that allows you to put the connector on right-side up, or upside down.

If this should happen to you, and you are not sure whether the connector is on correctly, just reverse it. The connector has a terrible physical design, but you'll cause no electrical damage if you put it on upside down.

Broken wires inside the cable or connector are another very common problem, especially if you do very much cable swapping or cause other cable stress. We have this problem with the RS-232 cables in our office several times per year, because we are always reconfiguring something. One of two things usually happens: either the wire breaks right at the pin, or the pin gets pushed in or bent.

The best way to test for defective connectors or cables is to have a second cable. A second cable, whether you make it yourself or purchase a pre-made one, is a cheap mental stabilizer when your system quits because of a bad cable.

Preventing Problems

There are some things you should watch out for and a number of simple things you can do to provide a long and happy life for your computer.

One of the biggest culprits is heat. Make sure your computer, terminal and printers are in well-ventilated areas. If they're in a dusty area or if you've got smokers around the computers, it is well worth your while to pull the covers off at least once a year and clean out dust and grime.

Dust and grime prevent air from circulating around inside the computer. They also can act as an insulator on components that should be kept cool. Heat stresses are probably the biggest killer of electronic equipment.

The easiest way to clean out the dust and grime is with a new soft-bristled paint brush and a vacuum cleaner. The area that is most affected by heat is the power supply. Keep its louvers clean, or it will die.

If you have sticky grime in your computer, spray a little household cleaner on a soft cloth and wipe it clean. Don't spray the computer directly.

Lightning is a big computer killer in the south-eastern part of the country, where we live. From May through August we can expect storms several afternoons per week.

Don't trust the surge protectors on your AC power line to completely control the problem. They help, but lightning is very destructive. Lightning can kill your surge protectors; and, worst of all, not all problems come through the AC line.

For instance, our MD2 and our Okidata printer were victims of lightning last summer, and they weren't even plugged in! We have about a 20-foot cable between the MD2 and the printer. When lightning hit about 50 yards away, the cable acted like an antenna and killed the RS-232 drivers and receivers in the computer and the printer. It also destroyed other

---

Ken Grymala is a regular contributor to and columnist for MOR.

things in our home that weren't connected directly to the AC power lines.

The safest policy during lightning storms is to unplug the AC lines and any long cables you may have.

Another bit of protection is to make sure that your computer equipment (or even your TV or other electronic equipment) is not on the same AC breaker or fuse line as any electric motor. Examples of electric motors are refrigerators, air conditioners, electric lawn mowers, etc.

If a motorized device should overload the breaker, you no longer have the loading and regulating effects of the power line. The damage occurs when the breaker opens and the voltage to the electric motor is suddenly cut off. When this happens, the motor produces a very large "counter" voltage, which can cause severe damage to electronic equipment. Surge protectors may or may not help.

Disk Drives

People always ask me how often they should clean their disk drive heads. I generally only recommend disk drive cleaning when there are smokers near the computer or when you start having disk read errors.

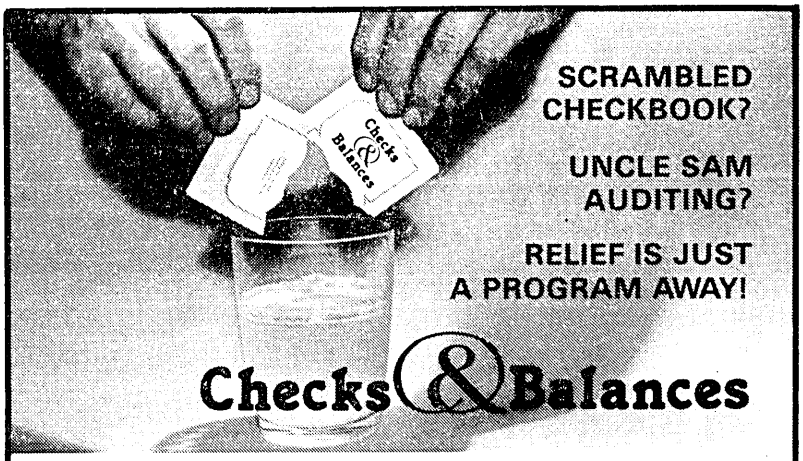
I have never cleaned the heads on our computers; but if you feel that you must, buy a cleaning kit that is sold under one of the diskette manufacturer's names.

If you are having read errors and cleaning doesn't do the trick, there is a good chance that your drive is out of alignment, or it may have an electrical problem. Drives can be repaired, sometimes inexpensively, sometimes not.

But they are easy to replace. The drives used in Morrow and most other CP/M computers were all standard "3/4-height" or "1/2-height" 40-track drives. New drives can generally be purchased for between $75 and $125. If you stick with the standards such as Shugart, Tandon, Teac and other large manufacturers, they are plug-for-plug compatible with one another.

Last Gasp!

Don't forget to make sure it's plugged in.



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UPCOMING THEMES

The contents noted here are not articles already written--they are suggestions we hope you will take as inspiration to write. Of course, material of general interest is also always welcome.

OCT/NOV86 **Educational Software**
Programming languages to write your own, instructional programs for toddlers to techies, the role of computers in education.... If you know about them, write about them. Know of any good CP/M educational software you'd like to review?

DEC/JAN87 **Desktop Publishing and Graphics**
With the arrival of more reasonably priced laser printers and new software, desktop publishing for CP/M machines is becoming a reality. The graphics capability of our Morrow terminals is negligable, but graphics software for printers is great. What programs are you familiar with? How are you using desktop publishing?

FEB/MAR87 **Programming Languages**
Perhaps you want to try a little programming of your own? But what "language" to use? What is a programming language, for that matter? Which ones are available for CP/M? Tips on using MBASIC, PILOT, Turbo Pascal, not to mention the C compiler in its many versions. Is Fortran a viable idea? What about assembly language?

ALL WRITERS NOTE: If you are interested in writing for MOR, submit a proposal of one to two paragraphs, indicating how you will approach your topic and your related experience.

If you are interested in reviewing software, indicate the need or concept addressed by the program and how you will approach assessing whether the program meets that objective.

If available, please include a sample of your (published or unpublished) writing. Direct your correspondence about articles Attn: Managing Editor. Published articles of at least 1,000 words earn the author a one-year subscription to MOR. For all submissions, please follow the **Writers' Guidelines on page 1.**

EVERYONE is most welcome to contribute programs to the Floppy of the Bimonth (FLOB) for all these issues. One cannot live by the printed word alone! Send Attn: Editor.

Controlling Electrostatic Damage

by Dave Grothe

While performing repairs on your Micro Decision computer, it is important to keep in mind that it contains devices easily damaged by static electricity. Some of the integrated circuits on the motherboard can be damaged by a static discharge of as little as 200 volts. To put this in perspective, when you shuffle across a carpeted room, touch a metal door knob and see a tiny spark, you have experienced a static discharge of at least 1,000 volts. However, no safety hazard exists because the amount of current that flows during the discharge is extremely small. If you have a static charge of only 200 volts on your body, no spark will occur when you discharge it, and you will not be aware that you have just zapped one of the components on your motherboard. Consequently, it pays to take some simple precautions to avoid this kind of damage.

The most effective way to prevent a static charge from accumulating on your body is to wear a grounding wrist strap. This device consists of a conductive strap that is worn on your wrist like a watch or bracelet. The strap is connected to a thin, insulated wire that is grounded to a metal water pipe or the safety ground socket on a grounded AC outlet. By providing a conductive path to ground, even the slightest static charge that accumulates on your body is quickly bled off by the wrist strap, making it safe for you to handle the static-sensitive components in your computer. For safety, the wrist strap contains a 1 megohm resistor in series with the ground wire. The resistor protects you from an electric shock hazard in the event you accidentally touch a part of the circuitry carrying high voltage.

If you don't have a grounding wrist strap or can't obtain one, the next best alternative is to touch the grounded metal chassis of the computer with your hand every few minutes. This will discharge any static that builds up; it just won't discharge it continuously as the wrist strap would. Also, while working on the motherboard, handle it only by the edges and avoid touching the metal leads of the integrated circuits unless absolutely necessary. If you have to make some electrical measurements, touch the tips of the instrument probes to the metal chassis before making contact with the circuit.

Dave Grothe is an electrical engineer for Motorola in Scottsdale, Arizona, who uses an MD3 for writing and recreational programming.

Finally, a word of warning. Page 5-3 of the Micro Decision Service Guide suggests moistening the carpet with a spray bottle filled with water to help prevent the build-up of static electricity. The theory behind this suggestion is sound. Carpets are a notorious source of static electricity and moisture makes it difficult for a static charge to accumulate. However, standing on a damp floor while working with your hands inside a machine connected to 120 volts AC could literally give you the shock of your life. **DON'T DO IT.**

Instead, work in a room without carpeting, wear a grounding wrist strap or discharge your body by frequently touching the computer's metal chassis, and both you and your computer will survive the repair bench. ■

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CP/M ALIVE!

by Ken Grymala

Maintenance and Repair Insurance

Whether you have a Morrow, a Kaypro, a Televideo or any other "single-board" CP/M computer, service manuals should be considered your number one insurance policy to keep it running.

Our "in-between" generation of computers, e.g., the Morrow Micro Decisions and the Kaypros, are all very similar electrically. These computers consist of a single Printed Circuit (PC) board that contains the microprocessor, memory, disk drive interfaces and communications interfaces (printer, terminal, modem, etc.). For the most part, all of these computers use common parts that can be purchased at most electronic supply companies.

Earlier versions of Morrow computers, and CP/M computers from CompuPro, Northstar and others, used standard "S-100 bus" plug-in boards. The new IBM PCs and the PC clones also use plug-in boards. In both cases, there are lots of plug-in boards available; and since they follow an electrical interface standard, boards from one manufacturer will generally work with boards from a different manufacturer. With most major failures, new boards can be purchased and installed to replace a function.

We don't have that luxury with our single-board computers, although some repair companies still have stocks of replacement cards for computers such as ours. If your computer dies, they just tear out the old card and replace it with a new or repaired card. But it is far more practical and reasonable to just replace the bad components on such a card.

Send your questions and comments to Ken Grymala at P.O. Box 2540, Manassas, VA 22110.

CP/M computers are relatively easy to repair, and there are a lot of competent computer repair technicians who are willing to perform such repairs. However, it's futile for even the seasoned expert to try and repair a computer or terminal without a schematic and certain technical data.

Morrow owners are very fortunate. Thanks to Sypko Andreae, the man responsible for this magazine, and a few other dedicated people in the MOR office in Berkeley, we have very complete technical documentation on all of the Micro Decision computers and the terminals that were sold under the Morrow name. Last summer, they spent a lot of time gathering information from Morrow and organizing it. They put together a set of documentation that can help keep the Morrow Micro Decisions running for many years to come.

I have all of the documentation except the MDT20 manual, but I feel that most people could get by with just two manuals. All that you really need is the appropriate computer service manual and the appropriate terminal service manual.

The Micro Decision Service Guide contains schematics and information about all versions of MD1, MD2 and MD3 computers. A similar manual, the Hard Disk Micro Decision Service Guide, covers all of the Morrow Micro Decisions with hard disks, such as the MD5 and MD11 models.

These two computer service manuals are similar, and both include lots of good trouble-shooting and repair information. These manuals also tell you how to run the internal ROM diagnostics, which are extremely helpful in troubleshooting everything from a bad RS-232 port, or terminal, to a bad disk drive.

The MDT50 Video Display Terminal Service Manual and the MDT60 Video Terminal Service Manual are both very well done. They include good troubleshooting charts, waveforms and, of course, schematics. The MT70 is virtually identical to the MDT60, and the small differences that exist are covered in a supplement to the MDT60 manual.

As for the disk drive manuals, I really don't recommend them unless you have the equipment and knowledge to perform disk drive repairs and alignment. The disk drives that are used in the Morrows are all very common, industry-standard drives. If they are only out of alignment, a good computer repair shop will know how to align them. For other problems, it is generally easier--and just as inexpensive--to replace them yourself. It's easy, and it's covered in the MD service manuals.

Most, if not all, of what is in the Diagnostics II User's Manual is already inside your computer in the built-in ROM diagnostics. I do not recommend this unless you are doing extensive maintenance.

If you have a CP/M computer other than a Morrow Micro Decision, there is help for you also. For

instance, if you have a Kaypro, you can obtain upgrade kits, ROMs, schematics and other valuables from Micro Cornucopia, P.O. Box 223, Bend, OR 97709. Until just recently, this magazine had been providing exclusive technical support to the CP/M community. Back issues of the magazine are available.

The First Osborn Group, or FOG, has many chapters throughout the country, and they are extremely helpful to owners of orphaned computers--CP/M and others. They put out a very good CP/M-oriented publication called the FOGHORN. They can be contacted at P.O. Box 3474, Daly City, CA 94015-0474.

Other major CP/M manufacturers, such as CompuPro (now Viasyn) and Televideo, had excellent dealer networks and dealer support during the heyday of CP/M. They still maintain many of the same dealers for their newer computers. As far as I know, both of these companies are also still producing CP/M computers. Documentation and upgrades continue to be available through their dealers.

CP/M Software, Where Is It?

Do programs exist out there that aren't word processors, spread sheets, data bases, languages or computer utilities? If so, what are they and where are they? And, are they any good?

From letters I've received, I know I'm not the only one who is looking for additional software. Hopefully, we've been looking in the wrong places, or we're not on the right mailing lists.

I also know there are a lot of programs out there that aren't worth spending your time and money on. I've purchased some of them, and I'm sure you have too.

For instance, I recently got a complimentary copy of MAG/base2, from MAG software, for review. It's a data base that is intended for Morrows and other CP/M computers. It's also available for PC/MS-DOS computers. In my opinion, it is a program that is not worth a second look. For Morrow owners, it has little to offer over Personal Pearl.

MAG/base2 comes in a very attractive sealed package. As soon as you open it, you know you may have made a mistake, since "once this package is opened, this product is not returnable for refund or credit" (directly off the disk package label). There are lots of other warnings and threats sprinkled throughout the voluminous documentation that comes with it.

The package will not work on an MD11--at least not my MD11 with CP/M 3.0, version 1.8, and ROM version 1.9. I tried everything I could think of to get it to accept the 16-digit protective serial number it needs to start the installation. I was also unable to find any phone numbers or other user support assistance.

As a program, MAG/base2 is too big to be practical on an MD2, which is what I ended up running it on. MAG/base2 comes on four disks, which take up 604K. You also need a data disk. From the size perspective, it doesn't offer any advantage over Personal Pearl.

Installation is long and painful. If you make a mistake anywhere in the installation procedure, you have to start all over! I must admit that they warn you of this, but still...!

MAG/base2 is the kind of package that causes computer novices to develop strong hatreds for computers.

However, I know that there must be many other good and bad programs out there that we don't know about. I am hot on the trail of some promising sources, and I hope to be able to report good things in my next column.

Additionally, if you are using a CP/M software package that is adapted to your particular specialty; and, whether it is good or bad, let me know. Better yet, write a review for MOR. Also, if you know of a reputable place that sells special CP/M software or a variety of CP/M software, let the rest of us know.

Next issue I hope to report on several promising sources of general purpose and unique software suppliers. But I also need your help.

Happy computing.

HOT TIP

Since many dot-matrix printers use ribbons that are identical in appearance to typewriter ribbons, some people make the assumption that these ribbons are interchangeable. But that's not the case.

Dot-matrix printers should not use typewriter ribbons for two reasons. The most important one involves the ink. Typewritter ink has particles of carbon suspended in a base. After a while these carbon particles work their way around the wires of the printhead and gum it up. Dot-matrix ribbons, on the other hand, use a non-particle dye. If you use a typewriter ribbon on a dot-matrix printer, eventually you'll find that you're getting smeary, messy printouts.

The second reason you shouldn't use typewriter ribbons on your dot-matrix printer is that dot-matrix ribbons are made of nylon, which is tougher and will last longer than most cotton typewritter ribbons.

--Bruce Gowens

Where to Get Your System Fixed: A List of Repair Shops Servicing MDs

Note: Shops are sorted by ZIP codes within states. To find the closest shop, look for the ZIP code nearest your own.

California

Drive Masters
489 S. Robertson Boulevard
Beverly Hills, CA 90211
213/278-3748

SYSTECH
1000 E. Walnut, #200
Pasadena, CA 91106
818/449-3239

Data Systems West
4529 Van Nuys Boulevard
Sherman Oaks, CA 91403
818/907-9110

Advanced Computer Repair
1022 Illinois Street
San Francisco, CA 94107
415/554-0500
Also repairs virtually all dot-matrix & daisy-wheel printers

Micro Age Computer Store
1150 Contra Costa Boulevard
Concord, CA 94523
415/680-1489

Microcomputer Service Network
3849 Peralta Boulevard
Suite A
Fremont, CA 94536
Printer repair specialists

Faught Data Systems
39267-A1 Liberty Street
Fremont, CA 94538
415/792-7945

Civil Computing
2111 Research Drive
Livermore, CA 94550
415/455-8086
Also does upgrades

Jacobs Computer Service
P.O. Box 415
Pinole, CA 94564
415/724-2446
Also repairs Decision 1 & S-100; no printer repair

RIX Computer Systems
2999 Teagarden Street
San Leandro, CA 94577
415/357-0971
Super Service Center

AAA Computers
3824 Telegraph Avenue
Oakland, CA 94609
415/653-3123
Repairs terminals and monitors only

Silicon Bay Systems
440 Grand Avenue
Suite 401
Oakland, CA 94610
Repairs all MDs and Pivots

Micro Systems Troubleshooters
3014 Shattuck Avenue
Berkeley, CA 94705
415/540-5435
Also does upgrades and modifications

Berkeley Computer
1569 Solano Avenue
Berkeley, CA 94707
415/526-6333
Drive alignments, MDT20 & MDT50

Serviceware
720 Aldo Avenue
Santa Clara, CA 95054
408/988-2251
800/221-8381
Takes jobs by mail

Micro Line Computer Services
1057 College Avenue
Suite 102
Santa Rosa, CA 95404
707/575-7991

Colorado

Computer Technology, Inc.
6311 N. Federal Boulevard
Denver, CO 80221
303/427-4438

Loveland Computer Center, Inc.
1415 N. Cleveland Avenue
Lovelend, CO 80532
303/667-9095
Super Service Center

Florida

Xerox Service Center
716 Northlake Boulevard
Altamonte Springs, FL 32701
305/830-8109
Also repairs terminals

Georgia

Southern Computer Associates
2799 Delk Road
Marietta, GA 30067
404/952-0412
Repairs all MDs & Decision 1s; repairs Freedom terminals only

Indiana

Technique Systems
209 N. Main
Goshins, IN 46526
219/534-1448

Maryland

Micro Repair Service
10 Allegheny Avenue
Towson, MD 21204
301/339-7170

Michigan

Office Calls
7844 Indian
Delton, MI 49046
616/664-5888

New Hampshire

Computer Data Services
Meeting Place Mall (Rte. 101)
Amherst, NH 03031
603/673-7375
Repairs all components;
takes jobs by mail

New Mexico

Data Terminal Service
715 Rankin Road, N.E.
Albuquerque, NM 87107
505/345-1611

New York

Pure Logic
138 Montague Street
Brooklyn, NY 11201
718/625-3113

North Carolina

Computer Parts & Service
914-A North Elm Street
Greensborough, NC 27401
919/272-8399
Southeast Super Service Center

Texas

Personal Computer Store
88 S. Greenville Avenue
Richardson, TX 75081
214/690-8888

Washington

Data Tech Reliance
1020 S. 344th
Suite 212
Federal Way, WA 98003
206/952-2400
Repairs disk drives only

Concurrent Business Systems
820 Fourth Street
Anacortes, WA 98221
206/293-5154

Concurrent Business Systems
1317 Railroad Avenue
Bellingham, WA 98225
206/671-9966

Business Computer Solutions
1301 Fraser
Suite A-11
Bellingham, WA 98226
206/671-8611

For Parts Only

Silicon Valley Surplus
4401 Oakport
Oakland, CA 94601
415/261-4662

Xerox Services Centers, located throughout the United States and Canada, used to repair Morrow Micro Decisions. About the time Morrow stopped making the MDs, Xerox stopped selling service contracts for MDs. To date, however, most Xerox Service Centers are willing to repair terminals, some printers and most disk drives. The only component they won't service is the Morrow motherboard. With a little perseverance, you might be able to get a Xerox Service Center to swap boards rather than repairing it. (A replacement board can be purchased from Silicon Valley Surplus.)

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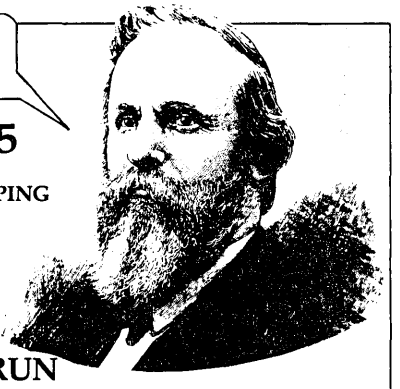

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- Prints mailing labels (alphabetically or by zip).
- Prints Rolodex style cards.
- Prints a phone list.
- Puts names in a new file for use by Mailmerge.
- Prints any of the above, selected by name, state, zip, type, or date of entry.
- Searches names or notes for any word (for example: "July 4" or "John Brown" or "Mississippi").

GREAT FOR:

Sales Leads, Customer Inquiries, Club Records, Birthdays, Xmas Card List. Can be used as a Calendar or List of Things to Do. All of these can be mixed together but still retrieved by category. Or you can keep a separate list for each.

RUNS ON:

Apple CPM
Columbia
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Corona
Eagle (all)
Epson QX-10
IBM PC,XT, PC jr,AT
Kaypro (all)
Morrow (all)
Osborne (all)
Panasonic
Radio Shack CPM
Sanyo (all)
Tandy (all)
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Zenith 100 & 150
8" CPM
Other compatibles

Mail to: James River Group, 125 N. First St., Mpls, MN 55401 ***1-800-654-6903***

Name _____
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Address _____
City/State/ZIP _____
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Computer Model _____
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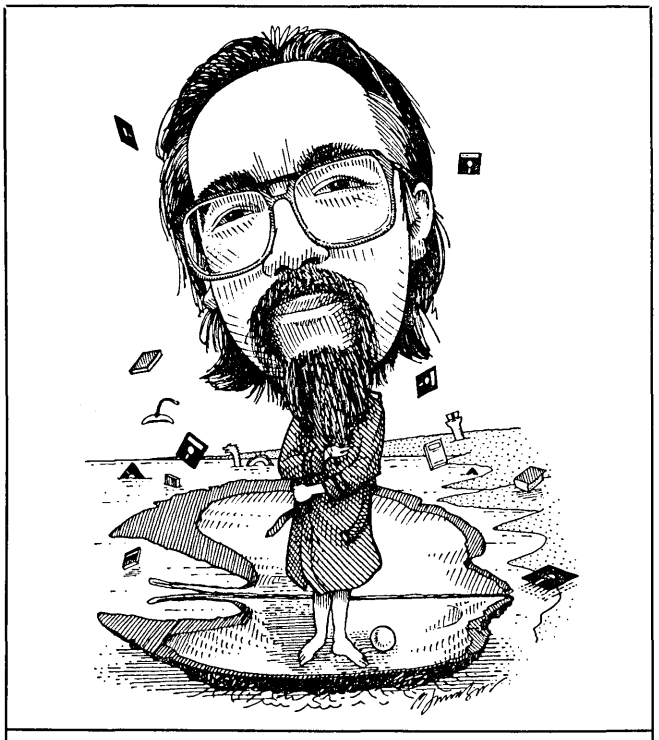

GETTING PERSONAL WITH PEARL

by Bruce Gowens

In the last issue, I illustrated how a single Pearl data base can supply data to several other data bases, and I explored some of the possibilities available in having up to five files open. This time I'm going to discuss some of Pearl's easy entry features, including how they work with multiple input forms.

One PEARLED (Pearl Enter Data) feature is the use of Control-N. If the datum you are entering in a particular field is identical to the one entered in the same field of the previous record, a simple Control-N will save typing by filling the field in. Examples of repetitious data like this might be transaction dates, ZIP codes and the like, or you might have presorted data so that similar records are entered one after another. ADJOURN, from last issue's column, is the kind of application that might have a lot of such repetition in each batch of entries. (When I refer to a form or field, it's one from last issue's column unless otherwise noted.)

Sometimes you might need to enter a sequential set of records. MOR's advertiser data base enters an "insertion" transaction (using a field such as TTYPE, with "I" for Insertion) for each issue covered by an advertising contract. The set of records is the same, except for the volume/issue field. On a six-issue contract, I just sit there wopping the Control-N through each field. After the volume/issue field, I Control-S back and increment the entry. This way, I don't have to keep a mental count, and I won't accidentally duplicate or skip an issue.

The Control-Z and Control-W, normally used only in the edit mode, work a little differently when dealing with multiple forms. ADJOURN, you may remember, was keyed to NAMES by the company name field. Let's say that Micro Interfaces Corp. (one of our advertisers, of course) makes a payment. To enter that payment in ADJOURN, I type "Micro<CR>" in the company name field while in the add mode. Since "Micro" is not the full name (and Pearl will only recognize an exactly correct entry), the address lines and other data fields that are being imported from NAMES will fill up with asterisks, the cursor will go back to the start of the company name field and the message "NOT FOUND" will appear on the bottom of the screen. No, I didn't goof; this is what I expected.

I then hit Control-Z. Pearl will look up the next record in NAMES, in a manner similar to "browsing" in the edit mode, and will fill in those fields with the imported data. But wait a minute--I want Micro Interfaces Corp., and the screen is now reading Micro Cornucopia! (Another one of our advertisers, of course.) So I hit Control-Z again. Pearl goes to the next record in NAMES and also changes the data in the address and other imported data fields. This time it shows Micro Interfaces Corp., and so I fill in the new data fields and put the record away with a Control-U or <CR><CR> at the end. I have now saved that record into ADJOURN (where I was all the time).

All of this has been done in the add mode. In the edit mode, using Control-Z will step through the records in ADJOURN, not the next record from NAMES.

Control-W works the same way, in the other direction. This means that you can "browse" through NAMES while entering data in ADJOURN. Which brings up another trick that can be quite useful: "spoon feeding" data from one data base to another to clean it up.

Let's say you want to get rid of all the year-before-last's transactions in ADJOURN. Pearl File Load is one way (see MOR Vol. 2, #5, p. 26). But if you don't have File Load or if there aren't a great number of records to be saved or gone through, the following method works and might even be easier:

Using PIP, make renamed copies of ADJOURN.S00 and ADJOURN.L00 on the same disk, keeping their extensions. We'll call them TEMP. The command line entries at the CP/M prompt are:

PIP B:TEMP.S00=B:ADJOURN.S00[OV]
PIP B:TEMP.L00=B:ADJOURN.L00[OV]

(You can also do this using the copy command of WordStar or NewWord, if you wish.)

Bruce Gowens would like to see interesting Pearl applications, hear of problems and know what you would like discussed in this column. Send mail c/o MOR, with SASE and phone number if a reply is desired.

Then call up PEARLDF (Pearl Design Forms) and tell it to design a form called TEMP. When you get to Step 1, "Form Layout," you will discover that TEMP is your old friend ADJOURN with a new name and no data. (The .S00 and .L00 files hold the form layout, and PEARLDF finds them already on the disk.)

We will be selectively transferring the records to be kept into TEMP.

Select the field you are going to use to key your transfer, and put it at the top of the form by creating a new line with Control-N, making the field and then going down and using Control-G to delete the field in its previous location. This will save moving the cursor around in the form as you are transferring records.

Now, go to Step 2, "Data Input Areas," and define that field exactly the same way it had been defined in its previous location.

Now, if your key (path) field between TEMP and ADJOURN was indexed, use Step 3, "Index for Finding Records," to index it in this new location. Otherwise, skip Step 3.

Go to Step 4, "Data from Other Forms," and define each retained field (i.e., those that are not display only) as data from ADJOURN. The very first field (the one you just moved to the top) is defined as the path (key) to the other form. Since ADJOURN already required that the maximum of five files be open and this would make a sixth, we have to break some link to another file. We can select any form in which the information is brought up for display only, Control-B on those fields and Control-Y the other file name to break the link.

Install TEMP with Step 5, "Form Installation." PEARLDF will create empty TEMP.D00 (data) and TEMP.E00 (index) files.

Use PEARLED with Control-Z and Control-W on that first field to select the records you are going to retain. Save them into TEMP with Control-U. Note that if you choose your key (path) field well, you can save yourself the bother of calling up or looking at the records you are getting rid of. For example, if you use the transaction date field as your key field, you would first enter the earliest date you wish to retain, and then the following Control-Zs will increment from there.

Copy all the ADJOURN files (including report files) and PEARL.DIR to an archive floppy. (Be sure to mark it clearly, including dates or data covered.) You may need it some day, and it is still ready and able to run. Then, delete ADJOURN.D00 and ADJOURN.E00 from your working disk, and rename TEMP.D00 to ADJOURN.D00 and TEMP.E00 to ADJOURN.E00. Call up PEARLDF, choose TEMP but use Control-O rather than <CR> to get TEMP out of your Form Directory.

Re-install ADJOURN and all its reports. You can do this with PEARLDR, from the command line, or with a submit file. (See "Command Line Entries," MOR Vol. 2, #5, p. 24.)

Delete TEMP.S00 and TEMP.L00 from the working disk.

There, you are back in business. We have used the old ADJOURN.S00 and ADJOURN.L00 files so that the new ADJOURN should look and act just like the old one --except that it now has the data and index files we created as TEMP.

Oyster Stew

Pearl can get a little strange if it doesn't find a file extension when it expects one. So, when making reports to disk or naming a source file for File Load, be sure the name is FILENAME.EXT and not just FILENAME.

You don't have to use underlines or "9"s to define a field; any continuous string of characters can be used. When defining a prompt field that will come from a mask form, the longest example will help you identify the purpose of both that and the following data field. "Payment_Due: 999.99" could be a prompt field and a data field, for example. ■

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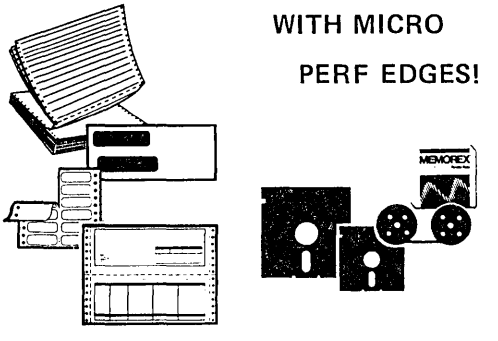

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BAMDUA's CP/M Celebration Available on Tape

by Sypko Andreae

The Bay Area Micro Decision Users Association (BAMDUA) celebrated the aliveness of CP/M on June 24, 1986--the day of the Morrow liquidation auction--with a panel discussion to which five CP/M luminaries were invited: Wayne Masters, president of PRACSA (sysops association); Irv Hoff, doyen of CP/M programmers; Dick Ezzard, assistant sysop of KAY*FOG BBS; Nancy Mulvany, editor of BAKUP News, the Bay Area Kaypro newsletter; and Ken Fowler, programmer and sysop of the Bay Area Kaypro BBS.

The next best thing to having been there is listening to the two cassette tapes produced by MOR. See the box for ordering information.

The two cassettes have four 30-minutes sides. Times shown are the times in the evening that the speakers began.

Side 1:

19:45 -- Introduction by Rick Charnes, BAMDUA board member.
19:55 -- Wayne Masters: Co-author of BYE, KMD and PBBS.
20:00 -- Nancy Mulvany: "We may have reached a point where choice of operating system may not be so important anymore." The CP/M market in England is stronger than here in the U.S. MS-DOS may be obsolete in a couple of years. Atari next?
20:10 -- Ken Fowler: "If CP/M is dead, who killed it?" Historical perspective. Public Domain (PD) is strong in CP/M.

Side 2:

20:17 -- Dick Ezzard: Let the application drive the choice of operation system. IBM clones are sometimes cheaper than souped-up CP/M machines. For new users, IBM clones may be the best route.
20:27 -- Irv Hoff: CompuServe CP/M section just about collapsed lately. Perhaps CP/M groups will go the way of old car clubs: There are still De Soto groups.

Side 3:

QUESTIONS FROM THE AUDIENCE:
20:45 -- Q: How do you get started getting PD software? A: Clubs. PD DOC files are good now, unlike a few years ago.
20:55 -- Q: I am part of a generic CP/M computer group. Where does one get all the machine-specific modem program overlays? A: Call Potpouri BBS (408/378-7474).
20:59 -- Critical mass syndrome: You need thousands of users to keep user interaction going. Comodore 128 just added about 600,000 CP/M users to the pool.
21:03 -- Q: Whatever happened to CP/M 86? A: It is really dead. But Concurrent CP/M still has a large following. Many alternatives to strict CP/M now: QPM, TURBODOS, ZRDOS. As a matter of fact, MS-DOS was based on CP/M.
21:10 -- Q: What is this ARC business about? A: ARC files, or archive files, are just like LBR files, but work in a more sophisticated way. It started in MS-DOS and is now migrating to CP/M. Look for UNARC11 on Potpouri BBS.

Side 4:

21:17 -- We in the Bay Area are lucky: We have 180 BBSs (Nevada has one BBS, Utah has none). Here we have access to 9,500 CP/M PD programs spread over the 20 most significant BBSs in the Bay Area.
21:28 -- Q: What is the best data base program to use? A: dBase II is widely used, but not supported; there are dBase II users groups, though. Other good programs include Procom, Alist, Filer and Personal Pearl. If you are just starting out, perhaps you should look at Atari and Amiga machines and their new software.
21:31 -- There are still nifty hardware improvements in the CP/M world, like the SCSI (Small Computer Systems Interface) bus adapter on Micro Mate CP/M and hard-disk board, about $450. CP/M prices are low. Does the CP/M crowd have a VW-owner mentality?
21:36 -- Q: What about five years from now? A: There will be lots of 68000-related desktop computers with a tiny footprint and the power of a Sun computer.
21:29 -- Q: How long until we can get rid of disks? A: That may take a while, like 10 years. Laser disks will be in wide-spread use before magnetic rotating memories go out.
21:34 -- Wrap-up comments. Meeting closed at 21:46.

CP/M CELEBRATION TAPES

Even if you weren't able to attend, you can still hear what these five CP/M stars had to say about the future of CP/M by ordering the tapes. The two 60-minute tapes are available for $15.00 (plus $.98 tax for California residents), including shipping and handling, from MOR, P.O. Box 5487, Berkeley, CA 94705, Attn: Tape.

REVIEWS

BOOK REVIEW

TITLE: **The Plain English Repair and Maintenance Guide for Home Computers**

AUTHOR: Henry F. Beechhold

PUBLISHER: Simon & Schuster Inc.
Computer Book Division (1984)

PRICE: $14.95 (paperback)

by Andrew Adler

The recent demise of Morrow Inc. makes personal computer maintenance and repair a subject apt to produce trembling in most of us. No longer do we have the resources, limited though they were, of George and Company. If disk drives grind to a halt, serial ports begin garbling data or dirt invades MD3 cases, it's up to us to find a remedy.

One alternative, of course, is to pay someone else to diagnose and repair your machine. For elaborate chores, especially those that involve intricate soldering and such, this may be an inevitable route. But there are many tasks that you--that's right, you--can perform easily and inexpensively yourself.

That's the message of The Plain English Repair and Maintenance Guide for Home Computers, an exquisitely clear, concise and even witty book by Henry F. Beechhold. It's been around for about two years now and has been well-received in many quarters. It isn't expensive, and--may the heavens be praised!--you don't need to be an electrical or mechanical expert to make sense of it.

In fact, you may find that Beechhold's volume quickly becomes indispensable. It explains, generically but usefully, how a computer's electronics work. You are told how to assemble a simple kit to make repairs at home.

Perhaps best of all, Beechhold supplies a timetable for computer maintenance that let you head off disasters. And if your machine does crash, the author supplies soothing words and several possible fixes.

David Dameo has supplied numerous illustrations--the sort you might doodle while on the telephone. A few are gratuitous, but most reinforce the text with a gentle dose of humor. Very little in this book confuses, a rare delight in computer-book publishing.

The book will reward straight-through readings, random dips or specific applications. Because most home computers share fundamental attributes (a floppy disk drive is essentially a floppy disk drive, no matter whom the manufacturer), the book can be used by owners of different machines. It isn't likely to become obsolete, just as the value of cleaning, adjusting and fixing aren't likely to become obsolete.

People who are fuzzy on computer-electronics theory can get a brief, non-threatening primer here. Not sure of the difference between a slotted and a Phillips-head screwdriver, or the meaning of a data bus, Ohm's Law or a NAND gate? This book will tell you, and you'll feel much better knowing, believe me.

Still, the volume's principal value is in its practical, "Lets get the thing up and running" aspects. A chapter called "Cleaning House" explains how to do exactly that. The book holds your hand, providing lots of reassurance, as you unscrew the computer's cover and banish that offending dust with a blast of compressed air. You are told how to disassemble a floppy disk drive and clean the read/write head, check the worm gear and, if necessary, replace the pressure pad. Printers, a prime source of grit and mechanical glitches, are similarly treated.

Occasionally the book shows poor judgment. One section describes adjusting tilted characters on your monitor, a procedure that must be done while the thing is plugged in and building up a potentially fatal charge. Simple as it is, such a procedure ought to be done by a qualified technician, not a layperson.

But these kinds of lapses are rare. Far more typical is the book's explanation of a serial (a.k.a. RS-232C) interface (at last, one that can be understood without three dozen readings!) and its walk-through of how to make a null-modem cable (espcially pertinent to Rev. 1 MD2 and MD3 owners connecting a printer or modem to that lone spare serial port).

Beechhold includes six appendices: Numbers and Logic (a bit of Boolean algebra), Tinkerer's Techniques and Tips (how to solder, use tools and some test instruments), Troubleshooting Techniques (a malfunctioning symptom matched to some possible explanations/solutions), Color Codes and Pinouts (circuit formulas, bus directories and the like), Sources and Suppliers (where to get parts and "useful gadgets"), and a Bibliography.

Finally, there is a fairly comprehensive glossary and a useful index.

Get this book. One is hard-pressed to think of a better investment.

Andrew Adler, the owner of an early MD2 and a member of the MOR Editorial Council, is a music critic for the Louisville (Ky.) Courier-Journal and Times.

SOFTWARE REVIEW

PROGRAM:	**Diagnostics II**
VERSION TESTED:	Version supplied to Morrow Dealers
MANUFACTURER:	SuperSoft, Inc. P.O. Box 1628 Champaign, IL 61820 217/359-2112 Orders: 800/762-6629
DISK SPACE:	144K total in various files
PRICE:	$125 (NOTE: Diagnostics II is available from MOR for only $37.50 with the purchase of the MOR Technical Manual.

by Michael Conroy

Morrow Designs did provide some support to dealers, although the extent and quality of that support seems to have been a matter of some debate. One item provided to the Micro Decision dealers was the Diagnostics II program by SuperSoft. Actually, it is a set of programs that can be used to test various elements of the MD computer. While the manual indicates that the programs should run on any 8080 or Z80 CP/M system, the version reviewed here is as distributed by Morrow. Now that we're all on our own, it's worth looking at this program.

Diagnostics II allows you to check for proper operation of the following: RAM, CPU, disk drives, terminal and printer. Each of the tests is fairly simple to run, and the manual provides clear instructions.

Memory Tests

There are two memory test programs provided: MTEST.COM and MTEST2.COM. MTEST is the main RAM test; MTEST2 checks the region of memory occupied by MTEST (0100H-14FFH). Each of these programs contains four different checks of RAM: a quick test, a walking bit test, a burn-in test and a speed test.

The speed test is supposed to determine the rated speed of your CPU and memory as a unit. Unfortunately, the results lead you to believe that a 4 MHz Micro Decision is running at only 2 MHz. The section in the manual on the CPU test clarifies this by saying that you should expect that a 4 MHhz MD will appear to be only 2 MHz, but it still doesn't explain why.

The quick test first writes zeros into RAM and verifies whether the bits are set to zero. It then checks that all bits can be set to one, and then writes a random pattern into memory and checks if that is successful. The whole process takes a few minutes. Most RAM defects are supposed to be uncovered by this test.

The walking bit test is a tougher check. All of the bits in the area of interest (all RAM tests except the speed test require you to select the portion of RAM you want to test) are set to zero and then a one is walked through bit-by-bit. All of the bits except the location of the one are checked after each step to be sure they haven't changed. The process is repeated with all ones and a walking zero. This takes longer than you might imagine. The manual indicates that to check a 16K region could take up to 13 hours and four times longer (over two days!) for 32K. If you want to check all of your RAM on a 64K or 128K machine, it might be quicker to just go buy new RAM chips and install them! I didn't sit and time it, but it took over a week to check about 56K on my ailing MD2!

The burn-in test runs a simple loop to keep "refreshing" values into five bytes of memory repeatedly. It then checks for "afterimages."

Do the RAM tests work? Well, that's hard to say. No error messages means either the RAM is OK or something was missed. I wasn't able to find any errors, even though I suspect I have a RAM problem. But mine is an intermittent problem that may not have surfaced that week. I'm willing to give SuperSoft the benefit of the doubt on this question. I have not yet used MOVCPM to check some of the nooks and crannies overlooked by a stock run of MTEST. Still, I'm disappointed I came up empty-handed.

CPU Test

The program CPU.COM checks the speed of the Z80, as mentioned above, and tests the Z80 to ensure that all CPU instructions can be executed properly. This test is simple to run and lasts only a few minutes. Again, my test machine got a clean bill of health.

Disk Drive Programs

Diagnostics II contains a disk test program and a disk drive alignment program. The DISK.COM test program uses a blank formatted disk and checks for "hard disk" errors, seek errors and data transfer errors. The "hard disk" errors are problems such as open drive doors or a write-protected test disk and have nothing to do with hard disks.

The program ALIGN.COM is to help align your drives, but requires that you have a special alignment disk (anybody out there found one for any of the MD drives?) and an oscilliscope. Thus, most users will not be able to benefit from this program.

Terminal Test

TERM.COM tests several functions on your terminal. First, it prints all of the ASCII characters in barber pole fashion on the screen. Next it checks

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Michael Conroy is a member of the MOR editorial council. He is also vice president of MUGW and was a co-founder of the weekly online conferences for Morrow users in the CompuServe CP/M forum. By day, he is a systems engineer in Washington, D.C.

cursor addressing by displaying "X"s, starting from the bottom right, and then displaying a test pattern with the appearance of four cursors. It then runs a couple of background/foreground tests. This program ran fine on my MDT20 as provided on the disk; instructions are given for setting it up for other terminals. It's a fun test to watch even if nothing is wrong with your terminal. (If you've got an MDT20, try an ESC-0 from an A> to run the terminal's own test program, but be prepared to set up the terminal codes again, as the key click will be turned on.)

Printer Test

A printer test is also provided by Diagnostics II. As with the terminal test, a barber pole pattern of ASCII characters is generated by the test. The test also provides a complete check of print head and carriage motion for the following serial printers: Spinwriters, Qumes and Diablos. I don't know if they've expanded this list, so your printer may not get the full benefit of this test. I tested it with our Spinwriter and can attest that it is a pretty thorough test of that printer's motions.

Other Features

In addition to the above programs, a quick memory test (QRUN) and a quick disk test (QDISK) are provided. (QRUN calls QDISK, which, in turn, calls the CPU test.) They suggest using QRUN at the start of every session, as it only takes about four minutes. I hope they're kidding about that; what do they think we're running, IBM PCs?

A help program is provided, which is essentially an on-line manual. Also, a sample submit file for running the tests while you're gone is given.

The disk, memory and CPU tests can be set up to write to a log file for later review. However, the terminal program requires your presence, despite what their submit file says.

Conclusions

Diagnostics II provides some potentially valuable test capabilites. They aren't the type of programs you're likely to use often, however. The memory tests require some careful planning and patience. The alignment program requires additional software and hardware, which most users won't have. But the other programs may help pinpoint trouble spots.

Still, problem spots can pass right through this suite of programs. Our ailing backup MD2 passed with flying colors, but won't let me write this article or do anything else tonight and I'm no closer to figuring it out. But, maybe Diagnostics II will be of more help to you.

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SOFTWARE REVIEW

PROGRAM:	**OUT-THINK**
VERSION TESTED:	Version 1.0
AUTHOR:	Adam Trent
DISK SPACE:	84K (including help file--see text)
MANUFACTURER:	KAMASOFT 2525 S.W. 224th Avenue Aloha, OR 97007 503/649-3765
PRICE:	$69.95

PROGRAM:	**Thoughtline**
VERSION TESTED:	Version 2.1 for CP/M
AUTHOR:	Norm Worthington
DISK SPACE:	72K
MANUFACTURER:	Spite Software 4875 S.W. 19th Drive Portland, OR 97201 503/224-0137
PRICE:	$69.95

by Dale Alan Clark

CP/M Outline Processors Revisited

In the August/September 1985 issue of MOR, Tim Evans and I took a look at KAMAS, which at the time was the only outline processing software available to run on CP/M computers. KAMAS is a large and very sophisticated package that is billed as a "Knowledge And Mind Amplification System" (hence the name) and is built around a highly structured, FORTH-like programming language. Included in the KAMAS program is a powerful outline editing and information retrieval system. Although no programming is required in order to use the outline editor, the package is really overkill for the user who is mainly interested in organizing his or her thoughts in a structured manner.

In this article I will look at two new entries into the CP/M outline processor field. The first, OUT-THINK, is a descendant of KAMAS that retains the outline processing and information retrieval capabilities of its predecessor and adds some new features of its own. The second program is called Thoughtline, and it is an entirely new product from Spite Software. Both programs do an admirable job of basic outline manipulation, but there are some distinct differences in the approaches taken by the two authors, which I will point out as I go along. It's encouraging to see a continuing interest in and development of new software for CP/M computers. These two programs are excellent examples of the kind of new software that will help keep our Morrows (and their CP/M cousins) productive in the years to come.

Outline Processing--A Quick Review

Before getting into the details of the two programs, a short review of just what an outline processor is, is in order. First, what it does not do: It does not replace your word processing software. Most outline processors (including the two reviewed here) duplicate a lot of the text editing capabilities of a good word processor, but none have all the formatting and printing "bells and whistles" that are required to completely replace WordStar or NewWord for final editing and printing.

What an outline processor does that a word processor cannot do is allow you to assign structure to your text. Ideas and flashes of insight can be typed into the program as they come to mind and then arranged into nested hierarchical constructions called topics. Once entered and organized, your ideas become the bases for pieces of your document, and the outline processor lets you associate one or more paragraphs of free-form text with each. The resulting outline can be contracted to show only the highest level topics on the screen (thus hiding the clutter of detail) or expanded to show everything. Topics can be rearranged, promoted or demoted until the overall structure satisfies you, and then the whole affair can be printed (in various formats) or written to disk for further refinement with a word processor.

In short, an outline processor lets you manipulate your ideas in much the same way that a word processor allows you to manipulate words and paragraphs. It is a powerful tool for organizing your thoughts before you begin actually writing prose. The power and usefulness of these programs does not stop here, however, and a little imagination will yield numerous other helpful applications. In the writing area, they not only help organize your thoughts before you begin writing, but can help create a table of contents for your document when you're done (one program reviewed here even does this automatically). Another task might be to help organize your day or to set up and maintain an appointment calendar. Many other uses will come to mind as you become more familiar with the operation and capabilities of an outline processor.

(continued)

Dale Clark, an electrical engineer in Hunt Valley, Maryland, designs training and simulation systems for a living. In his spare time he serves as PD Librarian for BaltiMUG, the Baltimore Morrow Users' Group, which he helped establish.

One general comment on outline processors is in order before we proceed: Because of the structure imbedded within outline files and the way in which they are accessed by the outline processor, these programs tend to be rather slow, and they perform a lot of disk accesses. Text is not transferred to and from the disk in large chunks, as is the case with word processors, but in small structured pieces; hence the large amount of disk activity. This can be rather distracting when you're "on a roll" and you find your software is unable to keep up with your thought processes. Both of these programs suffer from this drawback to some degree, but it is the price you pay for the ability to manipulate text in a structured fashion. As you would expect, outline processors are much easier to live with on a hard disk- (or RAMdisk-) equipped computer.

Son of KAMAS

OUT-THINK is a cut-down version of KAMAS that dispenses with the language and programmability aspects of that package while retaining the outline processing features. OUT-THINK also performs some new tricks not previously available in KAMAS. One handy addition is a resize command to change the size of an existing topic file. Since both KAMAS and OUT-THINK require you to specify the size of a topic file before you start entering information (when you really don't know how much space you'll need), this new command is a welcome addition. Other changes include enhanced outline editor commands, expanded print formatting options and the ability to read data into a topic from a text file (more on these last two later). The outline editor has been completely rewritten (it runs somewhat faster than KAMAS; and, unlike KAMAS, OUT-THINK will run on any CP/M computer, not just those containing Z80 CPUs), but the basic look and feel of the editor is virtually the same for the two packages. Thus, if you already use KAMAS and are familiar with its operation, OUT-THINK will seem very natural to you. In addition, KAMAS users will be happy to know that while they're not identical, KAMAS and OUT-THINK topic files can be used interchangeably by either program. (If you're interested, KAMASOFT offers OUT-THINK at a substantial discount to owners of KAMAS.)

OUT-THINK is a very powerful program and, as such, requires the user to learn a great many commands in order to get the most out of the system. Fortunately, OUT-THINK provides a lot of support for this process, via an extensive on-line help facility. OUT-THINK provides help at any point within the program by accessing the file HELP.TOP provided on the distribution disk. This file is actually an OUT-THINK outline (all outline, or topic, files have the extension "TOP") and can be examined and edited just like any other outline. The price you pay for all this help is twofold--the first cost is speed; as mentioned above, outline files can take a long time to load. Pressing the key for help in OUT-THINK's topic editor displays a full screen of text illustrating the various commands available, but it takes my MD2 a lot of disk accesses and a full 20 seconds to do so! Waiting this long for the help screens gets old fast and thus discourages their use. The second cost for the available help is disk space; while the OUT-THINK program itself takes up 40K of space on the disk, another 44K is occupied by the help file. Although not a serious problem for Morrow owners (all of whom have at least one 186K floppy), it might cause headaches for people with single-density disks on their machines. Once familiar with the operation of the program, however, you can edit the help file down to a "bare bones" version (using a copy, of course), thereby saving a lot of space on your system disk.

The OUT-THINK installation program gives you the option of choosing two different "styles" of commands for the outline and leaf (paragraph) editors provided in the program. The resulting commands resemble those of either WordStar or Perfect Writer, although the resemblance is far from perfect, and the outline-specific commands remain the same in either case. One feature I particularly like about OUT-THINK's editor is its rich set of commands for moving about within the outline. These allow you to go up or down one level in the outline, go to the previous or next title of the same level as the current one, or go forward or backward one title regardless of level, all with just one keystroke. This makes it very easy to wander around within the outline and move to any point you wish with just a few simple operations. There are also commands to find the occurrence of a string of text in a title or even in a topic file other than the one currently being edited, which gives the program a powerful information retrieval capability.

One annoying characteristic I found was that while most commands in the outline editor have counterparts in the leaf editor, they aren't necessarily invoked with the same keystrokes. For example, to find a string of text in the outline editor, you type F, while in the leaf editor you type Control-Q. Neither, you'll notice, is the same as WordStar's Control-QF, even though I installed OUT-THINK to "look like" WordStar; but what really bothers me is that you need two different commands to do the same thing, depending on where you are in the program. This sort of nonsense makes OUT-THINK harder to learn than it should be, which is a shame considering how much thought went into the rest of the package.

When your OUT-THINK outline is complete, you can send it to your printer or write it to a disk file. OUT-THINK provides a large number of print formatting options, including settable margins, headers and footers; settable line spacing; and page numbering, just to name a few. In addition, you can also opt for a printed table of contents that lists all your topic titles along with the pages on which they appear. If you print your outline to disk, you have the choice of either a straight ASCII text file or a WordStar document file that can be edited further with your word processor for final printing. OUT-THINK also allows you to read a document file into your outline

and accepts several unique dot commands that specify paragraph titles and tell the program where to place the text in your outline's hierarchy.

Spite Strikes Back

The second program I examined is a fairly recent offering from Spite Software, whose slick blue-and-white catalog is probably familiar to most MOR readers. These are the folks who have vowed to stick with us CP/M machine owners in spite of a world gone mad over MS-DOS. They offer a number of high quality and reasonably priced CP/M products, and used to tout KAMAS before they decided they could do better by writing their own outline processor. The result is an excellent product they call Thoughtline, and it represents a valuable addition to Spite's stable of CP/M products. Being the smart businessmen that they are, however, the folks at Spite are also selling an MS-DOS version of Thoughtline. This is good news to those of us who use both CP/M and MS-DOS machines, as the outline files are 100-percent compatible between the two versions. All you need is a disk exchange program such as Microsolutions' Uniform, and you can carry your work back and forth between the 8-bit and 16-bit worlds, which is a big plus these days.

The first thing you notice when you bring up Thoughtline is that its opening menu looks awfully familiar--in fact, it is almost an exact copy of WordStar's and NewWord's opening menus. This similarity is no accident, as the author's intention was that using Thoughtline would be almost second nature for an experienced WS/NW user. This is an ambitious goal, but the result is that the average Morrow owner should be able to perform useful work with Thoughtline in almost no time at all. While OUT-THINK claims to have editing commands which "resemble" WordStar's, Thoughtline's commands actually are a subset of WordStar's, although a number of new commands have been added that are unique to the outline editing application.

Thoughtline's command repertoire includes the familiar block (Control-K) operations to move and copy text (only in the topic editor, however; not in the paragraph editor), as well as new operations to shift a marked block in or out or to clone a block of topics elsewhere in the outline. This last feature is an intriguing one and is essentially a special form of the block copy command. However, when you make changes to one of these topics, the copies are also automatically updated by the program. This is useful in an application like an appointment calendar, where you might maintain a list of tasks or appointments by priority (or alphabetically) at the top of your outline and the same list by date at the bottom. Updating or changing one of these automatically updates the other one. Neat, huh? Another unique trick up Thoughtline's sleeve is prioritizing. This lets you mark a block of topics of the same level and then quickly rearrange them by priority, using very few keystrokes.

Unfortunately, a number of useful WordStar commands are missing from Thoughtline; the ones I miss the most are find (and find & replace) in the outline editor and block operations in the paragraph editor. Since outline processors are not really intended to replace word processors but to augment them, this probably isn't a very fair criticism of Thoughtline. The problem is that the program acts so much like WordStar that I often find myself trying to use WordStar commands that aren't supported in Thoughtline, and then it takes a few seconds to figure out why nothing happens. The problem is aggravated by the fact that Thoughtline has no on-line help facility. If you type Control-K, for example, the program waits patiently for you to complete the command, but displays no "block menu" to help you do so (the way WordStar does with the help level set to 2 or 3). To their credit, Spite does provide a handy quick reference card in the back of the manual that helps a lot.

New outline-specific commands are invoked in Thoughtline by using a Control-U prefix and provide the ability to hide or unhide selected levels of the outline, perform the previously mentioned prioritize operation and switch between the topic and paragraph editing modes of the program. It is here that the help menus are missed the most, as none of these commands are familiar to users of WS/NW. However, the command mnemonics are pretty straightforward, so with a little practice they become second nature and using Thoughtline becomes almost automatic.

Like OUT-THINK, Thoughtline lets you print your finished outline to a disk file, as well as read a text file from disk into your outline. A nice addition in the latest version is the ability to both read and write WordStar document files that contain imbedded outline formatting commands. These are "double dot" commands (ignored by WS/NW) that specify the level at which each part of your document appears in the outline. The ability to both read and write formatted WordStar files means that you can create the framework of your document with Thoughtline, write it to a WordStar file and edit it to flesh out or clean up the text, and then read it back into Thoughtline for further reorganizing if desired. This is a very handy feature, particularly if document creation is your primary use for the program.

Choose Your Weapon

So there you have it, a capsule summary of two new entries into the field of CP/M "productivity software." Choosing the one that's right for you is largely a matter of taste, but you can't go too far wrong with either of these gems. I feel that OUT-THINK is the more powerful of the two programs, but Thoughtline wins hands down for user friendliness and has the added convenience of being available in both CP/M and MS-DOS formats. The correct choice depends on your intended application for an outline processor. OUT-THINK is strongly information oriented; and

although it has a lot of word processor-like capabilities, its strong suit is really the storage, retrieval and management of ideas. Thoughtline seems more document oriented and might be the better choice if you intend to use an outline processor primarily as a structured front end for your word processor. Although somewhat less versatile than OUT-THINK, it is a much easier program to master and has a lot of nice features.

Both programs are reasonably priced, come with excellent documentation, and, as an added bonus, each has a money-back guarantee! KAMASOFT gives you 60 days to decide if OUT-THINK suits your purposes; if not, you can return it for a full refund. Spite makes the same offer for Thoughtline, but gives you 90 days to make up your mind. In addition, the Thoughtline package comes with a promise of two free upgrades as new versions are released; and, according to the people at Spite, some of the deficiencies I've noted in this review are scheduled for correction in upcoming revisions of the program. With offers like these, what have you got to lose?

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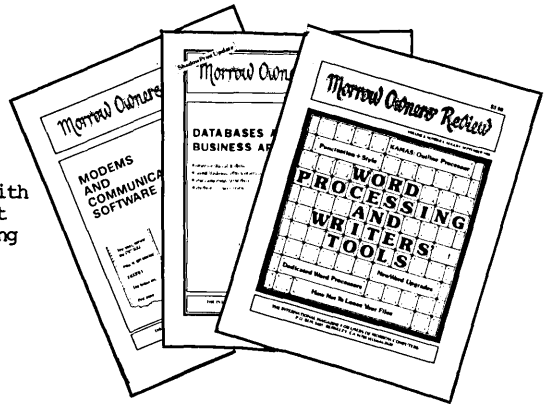

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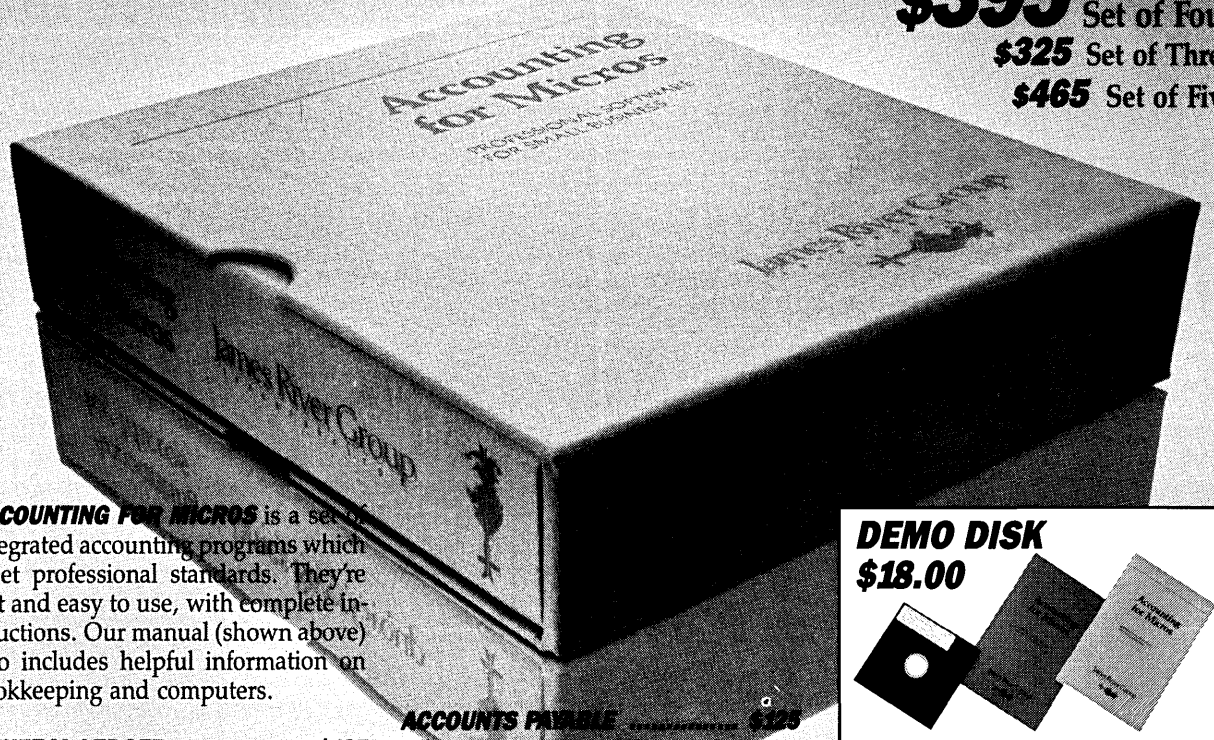

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